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Birds from human-modified Atlantic Forest landscapes of the middle-lower Paraíba do Sul River basin, southeastern Brazil

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Abstract. The Atlantic Forest is a highly diverse and threatened ecosystem that has been significantly reduced and degraded by human activities. This study provides a comprehensive inventory of bird species inhabiting the human-modified Atlantic Forest landscapes within the municipalities of Estrela Dalva and Volta Grande in the state of Minas Gerais, situated in the middle-lower Paraíba do Sul River basin, Brazil. Our data encompass non-systematic visual and audio records supplemented by MacKinnon lists collected between 2013 and 2019. Our survey identified 175 bird species, representing 54 families and 21 orders, including one species regionally categorized as Vulnerable and two species globally categorized as Near Threatened. Among the recorded species, 8.6% exhibited partially migratory habits, while 9.4% of the resident species were endemic to the Atlantic Forest. These findings underscore the critical importance of preserving forest fragments within historically degraded regions, such as the landscapes along the Paraíba do Sul River basin.

Key words. Anthropogenic environments, bird conservation, Minas Gerais state, seasonal semi-deciduous forests, species inventory

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INTRODUCTION

The Brazilian Atlantic Forest is one of the world's most diverse and threatened ecosystems, with approximately 890 bird species, 223 (25%) of which are endemic (Hasui et al. 2018; Vale et al. 2018). The Atlantic Forest originally covered a total area of approximately 1.5 million km^2, stretching across 17 of the 26 Brazilian states and reaching eastern Paraguay and northeastern Argentina in its southern portion (Ribeiro et al. 2009; Marques et al. 2021). However, the Atlantic Forest is currently highly reduced and fragmented, with approximately only 22.9% of its original forest vegetation remaining (Vancine et al. 2024). Owing to its high biological diversity and endemism levels, associated with a high number of threats, the Atlantic Forest is a biodiversity hotspot and a global priority area for conservation (Myers et al. 2000; Mittermeier et al. 2011).

Atlantic seasonal forests, which include deciduous and semideciduous forests, are the most devastated and threatened Atlantic Forest vegetation types in southern and southeastern Brazil (Ribeiro et al. 2009; Carlucci et al. 2021). Seasonal semideciduous forests experience a seasonal climate characterized by heavy rains in the summer and drought in the winter, resulting in the loss of foliage from 20 to 50% of arboreal individuals during the dry season (IBGE 2012). In Brazil, the Atlantic seasonal forests extend from the states of Espírito Santo and southern Bahia in the northeast to the states of Rio de Janeiro, Minas Gerais, São Paulo, southwestern Paraná, and southern Mato Grosso do Sul in the south (IBGE 2012). These forests were largely devastated during the period known as the "coffee cycle" in the 19th century, when most of the native vegetation was replaced by coffee monocultures and later by cattle pastures, mainly in the state of Minas Gerais, the largest Brazilian coffee-producing state at that time (Câmara 2003; Paula 2006; Carlucci et al. 2021). Currently, most of the remaining Atlantic seasonal forest fragments are small (<0.5 km^2) and isolated from each other (Ribeiro et al. 2009; Carlucci et al. 2021; Vancine et al. 2024).

Birds (class Aves) are among the most well-studied taxonomic groups in the world (Jetz et al. 2012). Some authors claim that the current knowledge of birds is greater than that of any other comparable group of organisms (Jetz et al. 2012; BirdLife International 2018; Lees et al. 2022). Currently, more than 11,000 bird species are known worldwide, of which 1,971 occur in Brazil, including residents or breeding migrants,

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seasonal non-breeding visitors, and vagrant species (Pacheco et al. 2021). Among the Brazilian species that breed or are assumed to breed in the country, 293 are endemic to Brazil (Pacheco et al. 2021). This makes Brazil one of the countries with the highest number of bird species worldwide and the third highest rate of bird endemism of all countries. However, Brazil also has the highest number of globally threatened birds, with 166 species (Develey 2021).

While the overall understanding of bird diversity in Brazil is extensive, there are significant gaps in our knowledge, particularly concerning specific habitats. Despite the large-scale destruction of Atlantic seasonal forests, little is known about their species richness and diversity (Hasui et al. 2018). This forest type remains one of the least studied within the Atlantic Forest ecosystem, and there is a lack of comprehensive inventories of vertebrate and plant communities (Carlucci et al. 2021). Currently, there is still insufficient knowledge regarding tropical birds that persist in Atlantic seasonal forest fragments and other environments within human-modified landscapes, despite their ecological significance (Ribon et al. 2003; Pizo and Tonetti 2020). In the Brazilian state of Minas Gerais, which has around 13% of its territory covered by Atlantic seasonal forests (Coura 2007), most bird studies have focused on inventories in protected areas (e.g., Silveira 1998; Simon et al. 1999; Melo Jr et al. 2001; Rodrigues et al. 2005; Manhães and Loures-Ribeiro 2011; Dornelas et al. 2012; Carrara et al. 2013; Barbosa et al. 2019). However, some studies have also been carried out in unprotected seasonal Atlantic forests and in areas with high levels of anthropogenic disturbances (e.g., Ribon 2000; Ribon et al. 2003; Ribon et al. 2004; Manhães and Loures-Ribeiro 2005; Faria et al. 2006; Lopes 2006). Evaluating the remaining biodiversity in human-modified landscapes is urgent for designing and implementing effective conservation strategies to preserve species diversity and ecosystem services. In this context, this study presents data on bird richness and composition in human-modified Atlantic Forest landscapes of the middle-lower Paraíba do Sul River basin in southeastern Brazil, Minas Gerais State.

STUDY AREA

We conducted our study in two adjacent municipalities located in the state of Minas Gerais in the southeastern region of Brazil: Estrela Dalva (urban center at 21°44′34″S, 042°27′42″W; Figure 1) and Volta Grande (urban center at 21°46′20″S, 042°32′18″W; Figure 1). The region of these municipalities, known as "Zona da Mata", suffered the effects of colonization and successive economic cycles that resulted in significant changes to the natural environments. These effects were particularly experienced in the first half of the 19th century with the expansion of coffee production in the state of Minas Gerais in areas bordering the state of Rio de Janeiro (Fonseca 1985; Paula 2006).

The study area has a tropical climate with a dry winter season (Aw in the Köppen classification; Alvares et al. 2013), an average annual temperature range of 18–31 °C, and an annual precipitation of approximately 1,500 mm (IBGE 2020a, 2020b). Estrela Dalva and Volta Grande are located in the middle-lower Paraíba do Sul River basin, which is one of the major rivers in the southeast region of Brazil (Marengo and Alves 2005). The Paraíba do Sul River runs through the states of São Paulo, Rio de Janeiro, and Minas Gerais (Marengo and Alves 2005). Over time, land use changes, deforestation, and forest degradation have transformed the remaining forests of the Paraíba do Sul River valley into human-modified landscapes. Examples of such landscapes can be observed in the 131,365 km^2 territory of Estrela Dalva and the 205,552 km^2 territory of Volta Grande.

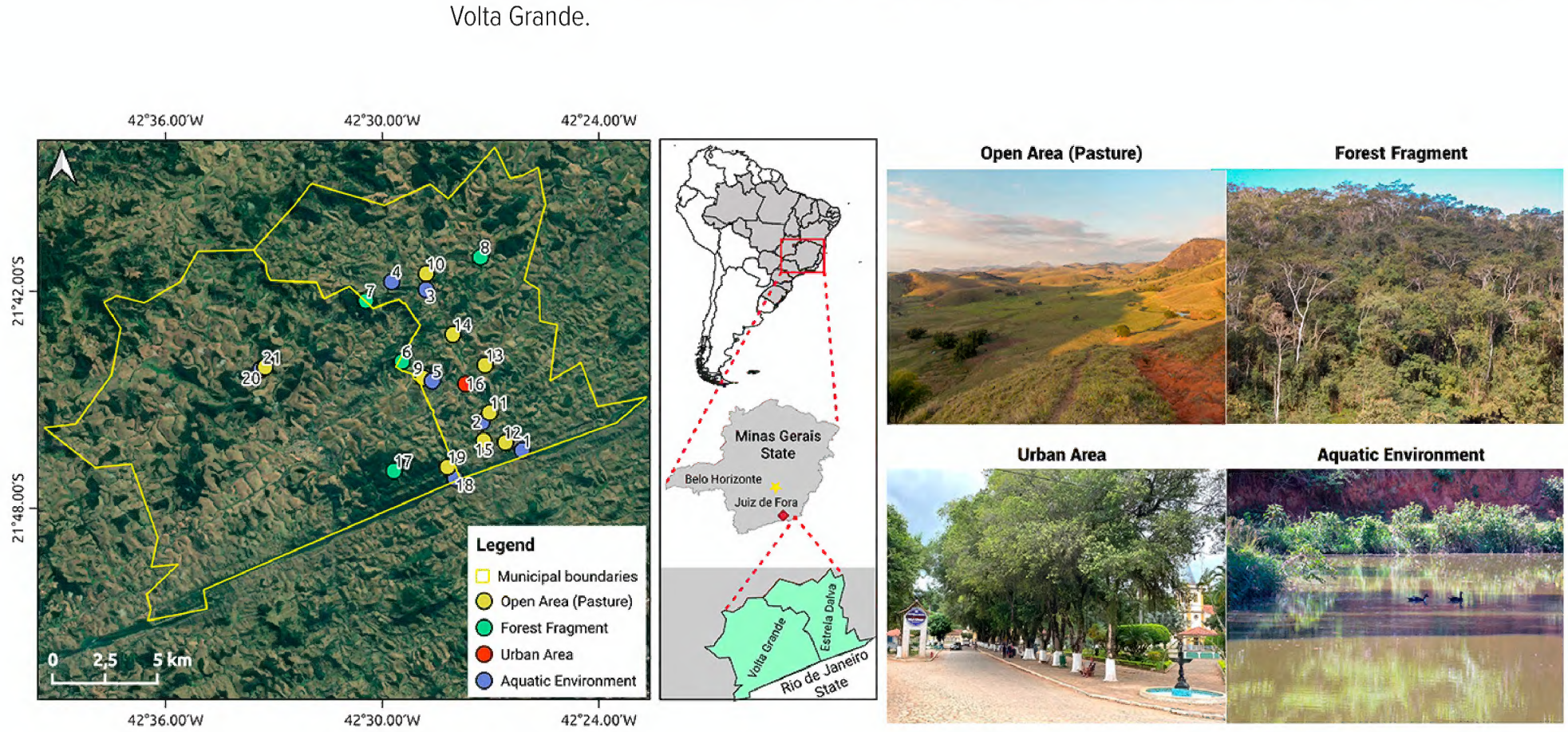

Figure 1. Location of the study area in the municipalities of Estrela Dalva and Volta Grande, southeastern Brazil, and sampled areas.

Currently, the municipalities of Estrela Dalva and Volta Grande mainly consist of pasturelands, with livestock farming being the primary activity and the main source of income for inhabitants. The remaining forests are Atlantic seasonal semideciduous forests (IBGE 2012), which vary in size, degree of conservation, and successional stages and are sparsely distributed throughout the landscape (Figure 1). Recent data indicate that only 6.7% and 10.71% of the original Atlantic Forest of the municipalities remain in Estrela Dalva and Volta Grande, respectively (SOS Mata Atlântica/INPE 2023).

METHODS

We carried out non-systematic observations of birds in different habitats—open areas (pastures), forest fragments, urban areas, and aquatic environments (rivers and lakes)—between 2013 and 2019. We conducted three survey campaigns per year, except in 2016 and 2019 when we conducted two survey campaigns per year. Each survey campaign lasted two days on average. On each day, we conducted diurnal and nocturnal bird surveys in two periods: 05:30–12:00 and 16:00–20:00. Each habitat was recorded at least once per survey campaign. In total, we carried out 31 days of surveys, the majority (= 26 days) of which occurred during the wet season. We did not survey during adverse weather conditions such as strong winds and heavy rains. To complement our results, during the last two years of this study (2018–2019), we used the MacKinnon list technique (MacKinnon and Phillipps 1993; Herzog et al. 2002). This methodology involves documenting the first ten species observed and/or heard in a list. Species must not be duplicated within the same list, and upon reaching the limit of ten species, a new list is started. We applied this approach consistently across all habitats investigated, starting at 05:30 and lasting 5—6 h in the morning, and later between 15:30 and 20:00, resulting in a total of 33 compiled MacKinnon lists. To facilitate the visual records, we used 8 × 42 binoculars (Bushnell Birding Series) and, when feasible, captured images of the observed species using a photographic camera (Nikon D3200 with a 55–200 mm lens). In addition, to detect less conspicuous species, such as forest hawks and owls, we employed the playback technique, which entails replaying the song or call of a specific species using a sound source. This method elicits a vocal response from the target species, facilitating its detection through vocalization or by its approach to the sound source (Vielliard and Silva 2010). To apply this technique, we pre-selected the forest hawk and owl species that could potentially inhabit the study area, totaling 18 species. Our playback protocol involved a 20-minute sequence, including three repetitions of each species' song, interspersed with three 5-minute periods of silent listening for their response. We utilized recordings available from the citizen science platform WikiAves and used playback in all sampled habitats, considering the potential occurrence of species in each of them.

We provid information on the conservation status of the species according to the global (IUCN 2023), national (MMA 2022), and regional (Minas Gerais State; COPAM 2010) lists of threatened species. We followed Vale et al. (2018) to classify the species endemic to the Atlantic Forest domain and Somenzari et al. (2018) to classify species according to their migratory habits as resident or partially migratory (species whose populations are part migratory and part resident). We classified species in relation to forest dependence based on the information in the literature (Sick 2001; Siva et al. 2003; Sigrist 2013; Ridgely et al. 2015).

We recognized the species in the field with the help of specialized literature when necessary (Sick 2001; Sigrist 2013; Ridgely et al. 2015). Furthermore, we used WikiAves (http://www.wikiaves.com.br/) and Xeno-canto (https://www.xeno-canto.org/) to confirm the images and audio recordings. Hierarchical classification (including nomenclature, taxonomic sequence, and common names) adhered to guidelines established by the Brazilian Ornithological Records Committee (Pacheco et al. 2021). We used the *Birds of the World* database (Billerman et al. 2020) to describe the species in the "Identification" subsections.

RESULTS

We recorded 175 bird species (Table 1), including 172 native species and three introduced exotic species (Figures 2–9). These species were distributed among 151 genera, 54 families, and 21 orders (Table 1), with Passeriformes being the most diverse order, comprising 56.6% of the total recorded species (99 species), followed by Apodiformes (5.7%; 10 species). The most representative family was Tyrannidae, with 14.3% of the total species recorded (25 species), followed by Thraupidae (9.8%, 17 species). We identified 41 species exclusively by visual records and 22 species exclusively by vocalization records, whereas 64% (112 species) of the total species were identified through both types of records. Of the species selected to perform the playback technique, only two responded (*Accipiter striatus* and *Megascops choliba*). Among the taxa recorded, one is regionally threatened (in the state of Minas Gerais), *Formicarius colma ruficeps* (Spix, 1824), categorized as Vulnerable (COPAM 2010), and two are globally categorized as Near Threatened, *Jacamaralcyon tridactyla* (Vieillot, 1817), and *Primolius maracana* (Vieillot, 1816) (IUCN 2023). However, we did not record any threatened species either at the international or national level.

In terms of migratory status, 8.6% (15 species) of the total bird species recorded had migratory habits,

Table 1. Bird species recorded in the municipalities of Estrela Dalva and Volta Grande, southeastern Brazil, between 2013 and 2019. Habitat: OA = Open areas (pastures); FF = Forest fragments; UA = Urban areas; AE = Aquatic environments (rivers and lakes). Record type: VO = Vocalization; VI = Visual. Migratory status (MS): RE = Resident; PM = Partially migratory. Conservation status (CS, International/National/Regional): LC = Least Concern; NT = Near Threatened; VU = Vulnerable. End. = Species endemic to the Atlantic Forest. Forest dependence (FD): D = Forest-dependent; SD = Forest semi-dependent; I = forest-independent. Seasonality of records (SR): D = Dry season; W = Wet season.

Taxon	English name	Habitat	Record type	MS	CS (In/Na/Re)	End.	FD	SR
TINAMIFORMES								
Tinamidae								
Crypturellus obsoletus (Temminck, 1815)	Brown Tinamou	FF	VO	RE			D	D/W
Crypturellus tataupa (Temminck, 1815)	Tataupa Tinamou	FF	VO, VI	RE			D	D/W
ANSERIFORMES								
Anatidae								
Amazonetta brasiliensis (Gmelin, 1789)	Brazilian Teal	AE	VI	RE			I	D/W
GALLIFORMES								
Cracidae								
Penelope obscura Temminck, 1815	Dusky-legged Guan	FF	VI	RE			D	D
COLUMBIFORMES								
Columbidae								
Columba livia Gmelin, 1789*	Rock Pigeon	UA	VO, VI	RE			I	D/W
Patagioenas picazuro (Temminck, 1813)	Picazuro Pigeon	OA, UA	VO, VI	RE			SD	D/W
Patagioenas cayennensis (Bonnaterre, 1792)	Pale-vented Pigeon	OA	VO, VI	RE			D	D/W
Leptotila verreauxi Bonaparte, 1855	White-tipped Dove	OA, FF	VO, VI	RE			SD	D/W
Leptotila rufaxilla (Richard & Bernard, 1792)	Gray-fronted Dove	FF	VO, VI	RE			D	D/W
Zenaida auriculata (Des Murs, 1847)	Eared Dove	OA	VO, VI	RE			I	W
Columbina talpacoti (Temminck, 1811)	Ruddy Ground-Dove	OA, UA	VO, VI	RE			I	D/W
CUCULIFORMES								
Cuculidae								
Guira guira (Gmelin, 1788)	Guira Cuckoo	OA, UA	VO, VI	RE			I	D/W
Crotophaga major Gmelin, 1788	Greater Ani	OA, UA	VO, VI	RE			SD	D/W
*Crotophaga a*ni Linnaeus, 1758	Smooth-billed Ani	OA, UA	VO, VI	RE			I	D/W
Tapera naevia (Linnaeus, 1766)	Striped Cuckoo	OA	VO	RE			I	D/W
Piaya cayana (Linnaeus, 1766)	Squirrel Cuckoo	OA, FF	VO, VI	RE			SD	D/W
CAPRIMULGIFORMES								
Caprimulgidae								
Nyctidromus albicollis (Gmelin, 1789)	Common Pauraque	OA	VO, VI	RE			SD	D/W
APODIFORMES								
Apodidae								
*Streptoprocne zona*ris (Shaw, 1796)	White-collared Swift	OA	VI	RE			I	W
Chaetura meridionalis Hellmayr, 1907	Sick's Swift	OA, UA	VI	RE			SD	W
Trochilidae								
Florisuga fusca (Vieillot, 1817)	Black Jacobin	FF	VI	PM			D	W
Phaethornis ruber (Linnaeus, 1758)	Reddish Hermit	FF	VI	RE			D	D/W
Phaethornis pretrei (Lesson & Delattre, 1839)	Planalto Hermit	OA, FF	VO, VI	RE			SD	D/W
Colibri serrirostris (Vieillot, 1816)	White-vented Violetear	OA	VO, VI	RE			SD	D/W
Chlorostilbon lucidus (Shaw, 1812)	Glittering-bellied Emerald	OA, UA	VO, VI	RE			I	D/W
Thalurania glaucopis (Gmelin, 1788)	Violet-capped Woodnymph	FF	VO, VI	RE		x	D	D/W
Eupetomena macroura (Gmelin, 1788)	Swallow-tailed Hummingbird	OA, UA	VO, VI	RE			I	D/W
Chionomesa lactea (Lesson, 1832)	Sapphire-spangled Emerald	UA	VO, VI	RE			SD	D/W
GRUIFORMES								
Aramidae								
Aramus guarauna (Linnaeus, 1766)	Limpkin	OA, AE	VI	RE			I	D/W
Rallidae								
Porphyrio martinica (Linnaeus, 1766)	Purple Gallinule	AE	VI	PM			I	W
Aramides saracura (Spix, 1825)	Slaty-breasted Wood-Rail	OA	VO, VI	RE		x	D	D/W
Gallinula galeata (Lichtenstein, 1818)	Common Gallinule	AE	VI	RE			I	D/W
CHARADRIIFORMES								
Charadriidae								
Vanellus chilensis (Molina, 1782)	Southern Lapwing	OA, AE	VO, VI	RE			I	D/W

Taxon	English name	Habitat	Record type	MS	CS (In/Na/Re)	End.	FD	SR
Scolopacidae								
Gallinago paraguaiae (Vieillot, 1816)	South American Snipe	OA	VI	RE			I	W
Jacanidae								
Jacana jacana (Linnaeus, 1766)	Wattled Jacana	AE	VI	RE			I	D/W
PELECANIFORMES								
Ardeidae								
Nycticorax nycticorax (Linnaeus, 1758)	Black-crowned Night-Heron	OA, AE	VI	RE			I	D/W
Butorides striata (Linnaeus, 1758)	Striated Heron	OA, AE	VI	RE			I	D/W
Bubulcus ibis (Linnaeus, 1758)	Cattle Egret	OA	VI	RE			I	D/W
Ardea cocoi Linnaeus, 1766	Cocoi Heron	AE	VI	RE			I	D/W
Ardea alba Linnaeus, 1758	Great Egret	OA, AE	VI	RE			I	D/W
Syrigma sibilatrix (Temminck, 1824)	Whistling Heron	OA	VI	RE			I	D/W
Pilherodius pileatus (Boddaert, 1783)	Capped Heron	OA, AE	VI	RE			I	D/W
Egretta thula (Molina, 1782)	Snowy Egret	AE	VI	RE			I	D/W
CATHARTIFORMES								
Cathartidae								
Coragyps atratus (Bechstein, 1793)	Black Vulture	OA, UA	VI	RE			I	D/W
Cathartes aura (Linnaeus, 1758)	Turkey Vulture	OA	VI	RE			I	D/W
Cathartes burrovianus Cassin, 1845	Lesser Yellow-headed Vulture	OA	VI	RE			I	D/W
ACCIPITRIFORMES								
Accipitridae								
Elanus leucurus (Vieillot, 1818)	White-tailed Kite	OA	VO, VI	RE			I	W
Accipiter striatus Vieillot, 1808	Sharp-shinned Hawk	FF	VO	RE			SD	W
Heterospizias meridionalis (Latham, 1790)	Savanna Hawk	OA	VO, VI	RE			I	D/W
Rupornis magnirostris (Gmelin, 1788)	Roadside Hawk	OA	VO, VI	RE			I	D/W
Geranoaetus albicaudatus (Vieillot, 1816)	White-tailed Hawk	OA	VO, VI	RE			I	D/W
Buteo brachyurus Vieillot, 1816	Short-tailed Hawk	OA	VI	RE			SD	D/W
STRIGIFORMES								
Strigidae								
Megascops choliba (Vieillot, 1817)	Tropical Screech-Owl	OA, UA	VO	RE			SD	D/W
Glaucidium brasilianum (Gmelin, 1788)	Ferruginous Pygmy-Owl	FF	VO	RE			SD	W
Athene cunicularia (Molina, 1782)	Burrowing Owl	OA	VI	RE			I	D/W
TROGONIFORMES								
Trogonidae								
Trogon surrucura Vieillot, 1817	Surucua Trogon	FF	VO	RE			D	D/W
CORACIIFORMES								
Alcedinidae								
Megaceryle torquata (Linnaeus, 1766)	Ringed Kingfisher	AE	VO, VI	RE			I	D/W
Chloroceryle amazona (Latham, 1790)	Amazon Kingfisher	AE	VI	RE			SD	D/W
Chloroceryle americana (Gmelin, 1788)	Green Kingfisher	AE	VI	RE			SD	D/W
GALBULIFORMES								
Galbulidae								
Jacamaralcyon tridactyla (Vieillot, 1817)	Three-toed Jacamar	OA, FF	VO, VI	RE	NT/LC/LC	x	SD	D/W
Bucconidae								
Nystalus chacuru (Vieillot, 1816)	White-eared Puffbird	OA	VO, VI	RE			I	D/W
PICIFORMES								
Ramphastidae								
Ramphastos toco Statius Müller, 1776	Toco Toucan	OA, UA	VO, VI	RE			I	D/W
Ramphastos dicolorus Linnaeus, 1766	Red-breasted Toucan	FF	VI	RE		x	D	D
Pteroglossus aracari (Linnaeus, 1758)	Black-necked Aracari	OA	VO, VI	RE			SD	D/W
Picidae								
Picumnus cirratus Temminck, 1825	White-barred Piculet	OA, FF, UA	VO, VI	RE			SD	D/W
Melanerpes candidus (Otto, 1796)	White Woodpecker	OA	VO, VI	RE			I	D/W
Campephilus robustus (Lichtenstein, 1818)	Robust Woodpecker	FF	VO, VI	RE		x	D	D/W
Dryocopus lineatus (Linnaeus, 1766)	Lineated Woodpecker	FF	VI	RE			SD	D/W
Colaptes melanochloros (Gmelin, 1788)	Green-barred Woodpecker	FF	VO, VI	RE			SD	D/W
Colaptes campestris (Vieillot, 1818)	Campo Flicker	OA	VO, VI	RE			I	D/W

Taxon	English name	Habitat	Record type	MS	CS (In/Na/Re)	End.	FD	SR
CARIAMIFORMES								
Cariamidae								
Cariama cristata (Linnaeus, 1766)	Red-legged Seriema	OA	VO, VI	RE			I	D/W
FALCONIFORMES								
Falconidae								
Caracara plancus (Miller, 1777)	Crested Caracara	OA, UA	VO, VI	RE			I	D/W
Milvago chimachima (Vieillot, 1816)	Yellow-headed Caracara	OA	VO, VI	RE			I	D/W
PSITTACIFORMES								
Psittacidae								
Pionus maximiliani (Kuhl, 1820)	Scaly-headed Parrot	OA, FF, UA	VO, VI	RE			SD	D/W
Forpus xanthopterygius (Spix, 1824)	Blue-winged Parrotlet	OA, FF, UA	VO, VI	RE			SD	D/W
Primolius maracana (Vieillot, 1816)	Blue-winged Macaw	OA, FF, UA	VO, VI	RE	NT/LC/LC		SD	D/W
Psittacara leucophthalmus (Statius Müller, 1776)	White-eyed Parakeet	OA, FF, UA	VO, VI	RE			SD	D/W
PASSERIFORMES								
Thamnophilidae								
Dysithamnus mentalis (Temminck, 1823)	Plain Antvireo	FF	VO	RE			D	D/W
Thamnophilus palliatus (Lichtenstein, 1823)	Chestnut-backed Antshrike	OA, UA	VO, VI	RE			SD	D/W
Thamnophilus caerulescens Vieillot, 1816	Variable Antshrike	FF	VO	RE			D	D/W
Drymophila squamata (Lichtenstein, 1823)	Scaled Antbird	FF	VO	RE		x	D	D/W
Conopophagidae								
Conopophaga melanops (Vieillot, 1818)	Black-cheeked Gnateater	FF	VO, VI	RE		x	D	D/W
Formicariidae								
Formicarius colma Boddaert, 1783	Rufous-capped Antthrush	FF	VO	RE	LC/LC/VU		D	D
Scleruridae								
Sclerurus scansor (Ménétries, 1835)	Rufous-breasted Leaftosser	FF	VO, VI	RE		x	D	D/W
Dendrocolaptidae								
Sittasomus griseicapillus (Vieillot, 1818)	Olivaceous Woodcreeper	FF	VI	RE			D	D/W
Xiphorhynchus fuscus (Vieillot, 1818)	Lesser Woodcreeper	FF	VO, VI	RE		x	D	D/W
Lepidocolaptes angustirostris (Vieillot, 1818)	Narrow-billed Woodcreeper	OA, FF	VO, VI	RE			I	D/W
Xenopidae								
Xenops rutilans Temminck, 1821	Streaked Xenops	FF	VO, VI	RE			D	D/W
Furnariidae								
Furnarius figulus (Lichtenstein, 1823)	Wing-banded Hornero	OA	VI	RE			I	D/W
Furnarius rufus (Gmelin, 1788)	Rufous Hornero	OA, UA	VO, VI	RE			I	D/W
Phacellodomus rufifrons (Wied, 1821)	Rufous-fronted Thornbird	OA	VO, VI	RE			SD	D/W
Certhiaxis cinnamomeus (Gmelin, 1788)	Yellow-chinned Spinetail	OA, AE	VO, VI	RE			I	D/W
Synallaxis ruficapilla Vieillot, 1819	Rufous-capped Spinetail	FF	VO, VI	RE		x	D	D/W
Synallaxis spixi Sclater, 1856	Spix's Spinetail	FF	VO, VI	RE			D	D/W
Synallaxis albescens Temminck, 1823	Pale-breasted Spinetail	OA	VO	RE			I	D/W
Pipridae								
Chiroxiphia caudata (Shaw & Nodder, 1793)	Swallow-tailed Manakin	FF	VO	RE		x	D	D/W
Manacus manacus (Linnaeus, 1766)	White-bearded Manakin	FF	VI	RE			D	D/W
Tityridae								
Pachyramphus polychopterus (Vieillot, 1818)	White-winged Becard	FF	VO	RE			SD	W
Platyrinchidae								
Platyrinchus mystaceus Vieillot, 1818	White-throated Spadebill	FF	VO, VI	RE			D	D/W
Rhynchocyclidae								
Tolmomyias sulphurescens (Spix, 1825)	Yellow-olive Flycatcher	OA, FF	VO, VI	RE			D	D/W
Todirostrum poliocephalum (Wied, 1831)	Gray-headed Tody-Flycatcher	OA, FF	VO, VI	RE		x	D	D/W
Todirostrum cinereum (Linnaeus, 1766)	Common Tody-Flycatcher	OA, UA	VO, VI	RE			SD	D/W
Tyrannidae								
Camptostoma obsoletum (Temminck, 1824)	Southern Beardless-Tyrannulet	OA	VO, VI	RE			I	D/W
Elaenia flavogaster (Thunberg, 1822)	Yellow-bellied Elaenia	OA	VO, VI	RE			SD	D/W
Capsiempis flaveola (Lichtenstein, 1823)	Yellow Tyrannulet	OA	VO, VI	RE			D	W
Phyllomyias fasciatus (Thunberg, 1822)	Planalto Tyrannulet	OA	VO, VI	RE			SD	D/W
Attila rufus (Vieillot, 1819)	Gray-hooded Attila	FF	VO	RE		x	D	D/W
Myiarchus swainsoni Cabanis & Heine, 1859	Swainson's Flycatcher	OA	VO, VI	PM			I	D/W

Taxon	English name	Habitat	Record type	MS	CS (In/Na/Re)	End.	FD	SR
Myiarchus ferox (Gmelin, 1789)	Short-crested Flycatcher	OA	VO, VI	RE			SD	D/W
Pitangus sulphuratus (Linnaeus, 1766)	Great Kiskadee	OA, FF, UA	VO, VI	PM			I	D/W
Machetornis rixosa (Vieillot, 1819)	Cattle Tyrant	OA	VO, VI	RE			I	D/W
Myiodynastes maculatus (Statius Müller, 1776)	Streaked Flycatcher	OA, UA	VO, VI	PM			D	W
Megarynchus pitangua (Linnaeus, 1766)	Boat-billed Flycatcher	OA, UA	VO, VI	RE			SD	D/W
Myiozetetes cayanensis (Linnaeus, 1766)	Rusty-margined Flycatcher	OA, AE	VO, VI	RE			SD	D/W
Myiozetetes similis (Spix, 1825)	Social Flycatcher	OA, FF, UA	VO, VI	RE			SD	D/W
Tyrannus melancholicus Vieillot, 1819	Tropical Kingbird	OA, UA	VO, VI	PM			I	W
Tyrannus savana Daudin, 1802	Southern Fork-tailed Flycatcher	OA	VO, VI	PM			I	W
Empidonomus varius (Vieillot, 1818)	Variegated Flycatcher	OA, UA	VO, VI	PM			SD	W
Colonia colonus (Vieillot, 1818)	Long-tailed Tyrant	FF	VI	RE			D	D/W
Arundinicola leucocephala (Linnaeus, 1764)	White-headed Marsh Tyrant	OA	VO, VI	RE			I	D/W
Fluvicola nengeta (Linnaeus, 1766)	Masked Water-Tyrant	OA, UA	VO, VI	RE			I	D/W
Gubernetes yetapa (Vieillot, 1818)	Streamer-tailed Tyrant	OA	VO, VI	RE			I	D/W
Myiophobus fasciatus (Statius Müller, 1776)	Bran-colored Flycatcher	OA	VO	RE			I	D/W
Lathrotriccus euleri (Cabanis, 1868)	Euler's Flycatcher	FF	VO, VI	PM			D	D
Contopus cinereus (Spix, 1825)	Tropical Pewee	FF	VO	RE			D	D/W
Knipolegus lophotes Boie, 1828	Crested Black-Tyrant	OA	VI	RE			I	D/W
Xolmis velatus (Lichtenstein, 1823)	White-rumped Monjita	OA	VI	RE			I	D/W
Vireonidae								
Cyclarhis gujanensis (Gmelin, 1789)	Rufous-browed Peppershrike	OA, FF	VO	RE			SD	D/W
Hylophilus amaurocephalus (Nordmann, 1835)	Gray-eyed Greenlet	FF	VO	RE			D	D/W
Hylophilus thoracicus Temminck, 1822	Lemon-chested Greenlet	FF	VO	RE			SD	D/W
Vireo chivi (Vieillot, 1817)	Chivi Vireo	FF	VO, VI	PM			D	W
Corvidae								
Cyanocorax cristatellus (Temminck, 1823)	Curl-crested Jay	OA	VO, VI	RE			I	D/W
Hirundinidae								
Pygochelidon cyanoleuca (Vieillot, 1817)	Blue-and-white Swallow	OA, UA	VO, VI	RE			I	D/W
Stelgidopteryx ruficollis (Vieillot, 1817)	Southern Rough-winged Swallow	OA	VO, VI	PM			I	D/W
Progne tapera (Linnaeus, 1766)	Brown-chested Martin	OA	VO, VI	PM			I	D/W
Progne chalybea (Gmelin, 1789)	Gray-breasted Martin	OA, UA	VO, VI	PM			I	D/W
Troglodytidae								
Troglodytes musculus Naumann, 1823	Southern House Wren	OA, UA	VO, VI	RE			I	D/W
Donacobiidae								
Donacobius atricapilla (Linnaeus, 1766)	Black-capped Donacobius	OA	VI	RE			I	D/W
Turdidae								
Turdus leucomelas Vieillot, 1818	Pale-breasted Thrush	OA, FF, UA	VO, VI	RE			SD	D/W
Turdus rufiventris Vieillot, 1818	Rufous-bellied Thrush	FF, UA	VO, VI	RE			I	D/W
Turdus amaurochalinus Cabanis, 1850	Creamy-bellied Thrush	FF, UA	VO, VI	PM			SD	D/W
Mimidae								
Mimus saturninus (Lichtenstein, 1823)	Chalk-browed Mockingbird	OA	VO, VI	RE			I	D/W
Estrildidae								
Estrilda astrild (Linnaeus, 1758)*	Common Waxbill	OA, UA	VO, VI	RE			I	D/W
Passeridae								
Passer domesticus (Linnaeus, 1758)*	House Sparrow	OA, UA	VO, VI	RE			I	D/W
Motacillidae								
Anthus chii Vieillot, 1818	Yellowish Pipit	OA	VO, VI	RE			I	D/W
Fringillidae								
Euphonia chlorotica (Linnaeus, 1766)	Purple-throated Euphonia	OA, FF, UA	VO, VI	RE			SD	D/W
Passerellidae								
Ammodramus humeralis (Bosc, 1792)	Grassland Sparrow	OA	VO, VI	RE			I	D/W
Zonotrichia capensis (Statius Müller, 1776)	Rufous-collared Sparrow	OA	VO, VI	RE			I	D/W
Icteridae								
Leistes superciliaris (Bonaparte, 1850)	White-browed Meadowlark	OA	VI	RE			I	D/W
Psarocolius decumanus (Pallas, 1769)	Crested Oropendola	OA, FF, UA	VO, VI	RE			SD	D/W
Cacicus haemorrhous (Linnaeus, 1766)	Red-rumped Cacique	OA	VI	RE			SD	D/W

Taxon	English name	Habitat	Record type	MS	CS (In/Na/Re)	End.	FD	SR
Molothrus bonariensis (Gmelin, 1789)	Shiny Cowbird	OA	VO, VI	RE			I	D/W
Gnorimopsar chopi (Vieillot, 1819)	Chopi Blackbird	OA	VO, VI	RE			I	D/W
Chrysomus ruficapillus (Vieillot, 1819)	Chestnut-capped Blackbird	OA, AE	VO, VI	RE			I	D/W
Pseudoleistes guirahuro (Vieillot, 1819)	Yellow-rumped Marshbird	OA	VO, VI	RE			I	D/W
Parulidae								
Geothlypis aequinoctialis (Gmelin, 1789)	Masked Yellowthroat	OA	VO	RE			I	D/W
Setophaga pitiayumi (Vieillot, 1817)	Tropical Parula	OA, UA	VO, VI	RE			D	D/W
Basileuterus culicivorus (Deppe, 1830)	Golden-crowned Warbler	FF	VO, VI	RE			D	D/W
Cardinalidae								
Caryothraustes brasiliensis Cabanis, 1851	Brazilian Grosbeak	FF	VO, VI	RE		x	D	W
Thraupidae								
Nemosia pileata (Boddaert, 1783)	Hooded Tanager	FF	VI	RE			D	D/W
Emberizoides herbicola (Vieillot, 1817)	Wedge-tailed Grass-Finch	OA	VO, VI	RE			I	D/W
Dacnis cayana (Linnaeus, 1766)	Blue Dacnis	UA	VI	RE			SD	D/W
Coereba flaveola (Linnaeus, 1758)	Bananaquit	UA	VO, VI	RE			SD	D/W
Asemospiza fuliginosa (Wied, 1830)	Sooty Grassquit	FF	VO	RE			D	D/W
Volatinia jacarina (Linnaeus, 1766)	Blue-black Grassquit	OA	VO, VI	RE			I	D/W
Coryphospingus pileatus (Wied, 1821)	Pileated Finch	OA	VI	RE			SD	D/W
Tachyphonus coronatus (Vieillot, 1822)	Ruby-crowned Tanager	FF	VO, VI	RE			D	D/W
Sporophila lineola (Linnaeus, 1758)	Lined Seedeater	OA	VO, VI	PM			I	D/W
Thlypopsis sordida (d'Orbigny & Lafresnaye, 1837)	Orange-headed Tanager	OA	VO, VI	RE			SD	D/W
Conirostrum speciosum (Temminck, 1824)	Chestnut-vented Conebill	OA, FF	VI	RE			D	D/W
Sicalis flaveola (Linnaeus, 1766)	Saffron Finch	OA, UA	VO, VI	RE			I	D/W
Sicalis luteola (Sparrman, 1789)	Grassland Yellow-Finch	OA	VO, VI	RE			I	W
Haplospiza unicolor Cabanis, 1851	Uniform Finch	FF	VO	RE		x	D	D
Thraupis sayaca (Linnaeus, 1766)	Sayaca Tanager	OA, UA	VO, VI	RE			SD	D/W
Thraupis palmarum (Wied, 1821)	Palm Tanager	UA	VO, VI	RE			SD	D/W
Stilpnia cayana (Linnaeus, 1766)	Burnished-buff Tanager	FF, UA	VO, VI	RE			I	D/W

* Introduced exotic species.

all of which were classified as partially migratory (when only part of the population is resident and another part migrates), reproducing in Brazilian territory. Of the remaining 91.4% (160 species) classified as residents, 15 (9.4%) were endemic to the Atlantic Forest region. We also recorded three introduced exotic species: *Columba livia* Gmelin, 1789, *Estrilda astrild* (Linnaeus, 1758), and *Passer domesticus* (Linnaeus, 1758).

Regarding the sampled habitats, we found the highest species richness in open areas, with a total of 60 species recorded, followed by forest fragments with 42 species. We found nine species exclusively in aquatic environments and five species only in urban areas. The remaining species were recorded from two or more environments. In the following section, we provide a detailed account of the recorded species.

Annotated list of species

Order Tinamiformes
Family Tinamidae

***Crypturellus obsoletus* (Temminck, 1815)**, Brown Tinamou

Observations. BRAZIL – Minas Gerais • Volta Grande; 21°46′59″S, 042°29′42″W; 08.I.2017; obs.; 1 sex indet.

Identification. Head and hindneck entirely slate gregy, upperparts dark chocolate brown, underparts reddish or buffy brown, with black barring on the flanks. Sexes similar, but females tend to be more rufescent than males.

***Crypturellus tataupa* (Temminck, 1815)**, Tataupa Tinamou

Observations. BRAZIL – Minas Gerais • Estrela Dalva; 21°42′15″S, 042°30′27″W; 21°41′02″S, 042°27′17″W; first record on 17.VIII.2013; obs.; 4 (no sexual dimorphism).

Identification. Head and neck slaty grey, often darkest on forehead; rest of upperparts warm chocolate-brown. Bold scaly pattern of sharply white-edged black feathers on flanks; bill pink to orange-red, often with pale tip.

Order Anseriformes
Family Anatidae

***Amazonetta brasiliensis* (Gmelin, 1789)**, Brazilian Teal
Figure 2A

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°45′37″S, 042°27′15″W; 21°41′56″S, 042°28′47″W; 21°41′43″S, 042°29′44″W; 21°44′10″S, 042°33′22″W; first record on 07.I.2017; obs.; multiple (♂ and ♀).

Identification. Predominantly brown. Bill and feet coral-red to orange-red in male, female has olive-grey bill and duller-coloured legs and feet.

Order Galliformes
Family Cracidae

***Penelope obscura* Temminck, 1815**, Dusky-legged Guan

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°42′15″S, 042°30′27″W; 21°46′59″S, 042°29′42″W; first record on 17.VIII.2013; obs.; 4 ♂ and 2 ♀.

Identification. Predominantly black with bare facial skin also dark. Males and females distinguished by iris, red in male and pale brown in female.

Order Columbiformes
Family Columbidae

***Columba livia* Gmelin, 1789**, Rock Pigeon
Figure 2B

Observations. BRAZIL – Minas Gerais • Estrela Dalva; 21°44′33″S, 042°27′41″W; 30.III.2013; obs.; multiple (no sexual dimorphism).

Identification. Basic colour bluish grey in most. Bill dark grey. Iris varies from golden orange to orange to red-orange.

***Patagioenas picazuro* (Temminck, 1813)**, Picazuro Pigeon

Observations. BRAZIL – Minas Gerais • Estrela Dalva; 21°44′23″S, 042°28′52″W; 21°41′30″S, 042°28′47″W; 21°45′21″S, 042°27′01″W; 21°46′10″S, 042°26′35″W; 21°44′01″S, 042°27′09″W; 21°43′11″S, 042°28′02″W; 21°46′07″S, 042°27′11″W; 21°44′33″S, 042°27′41″W; 21°46′52″S, 042°28′12″W; 21°44′6″S, 042°33′14″W; first record on 30.III.2013; obs.; multiple (no sexual dimorphism).

Identification. Large pigeon. Head, nape, and upper breast pinkish purple. White line evident on closed wing.

***Patagioenas cayennensis* (Bonnaterre, 1792)**, Pale-vented Pigeon

Observations. BRAZIL – Minas Gerais • Estrela Dalva; 21°44′23″S, 042°28′52″W; 21°44′01″S, 042°27′09″W; 21°46′07″S, 042°27′11″W; first record on 30.III.2013; multiple (no sexual dimorphism).

Identification. Medium-sized pigeon. Predominantly purplish brown on rump and sides of head, with pale grey throat and belly.

***Leptotila verreauxi* Bonaparte, 1855**, White-tipped Dove

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°44′23″S, 042°28′52″W; 21°41′30″S, 042°28′47″W; 21°46′10″S, 042°26′35″W; 21°44′01″S, 042°27′09″W; 21°46′07″S, 042°27′11″W; 21°46′59″S, 042°29′42″W; 21°46′52″S, 042°28′12″W; first record on 30.III.2013; obs.; multiple (no sexual dimorphism).

Identification. Medium-sized dove. Mostly brownish olive to pale brown. Forehead pale; distinguished from *L. rufaxilla* by being greyer overall and not having a bluish forehead.

***Leptotila rufaxilla* (Richard & Bernard, 1792)**, Gray-fronted Dove

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°43′55″S, 042°29′27″W; 21°42′15″S, 042°30′27″W; 21°41′02″S, 042°27′17″W; 21°46′59″S, 042°29′42″W; 21°46′52″S, 042°28′12″W; 21°44′6″S, 042°33′14″W first record on 23.XII.2014; obs.; multiple (no sexual dimorphism).

Identification. Forehead greyish to bluish white, becoming bluish grey on crown. Upperparts olive-brown.

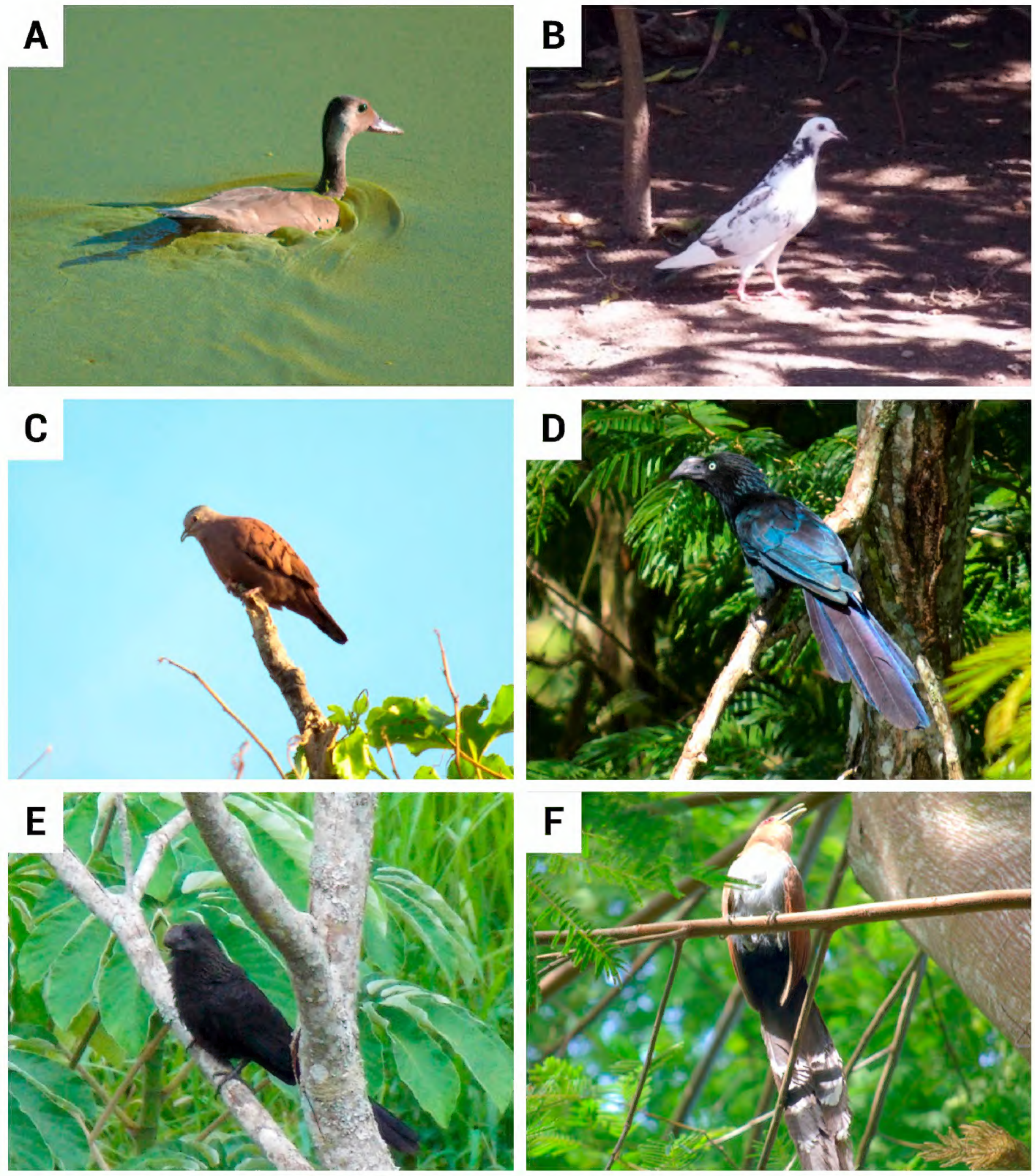

Figure 2. Bird species recorded in the study area. **A.** *Amazonetta brasiliensis*. **B.** *Columba livia**. **C.** *Columbina talpacoti*. **D.** *Crotophaga major*. **E.** *Crotophaga ani*. **F.** *Piaya cayana*. (* Introduced exotic species.)

***Zenaida auriculata* (Des Murs, 1847)**, Eared Dove

Observations. BRAZIL – Minas Gerais • Estrela Dalva; 21°44′23″S, 042°28′52″W; 21°41′30″S, 042°28′47″W; 21°45′21″S, 042°27′01″W; 21°46′10″S, 042°26′35″W; 21°44′01″S, 042°27′09″W; 21°43′11″S, 042°28′02″W; 21°46′07″S, 042°27′11″W; first record on 23.XII.2014; obs.; multiple (♂ and ♀).

Identification. Crown and nape bluish grey; rest of head, neck, and breast pinkish to purplish buff, shading to buff or cream on belly into undertail-coverts. Black spots on face and wings. Female similar but duller.

***Columbina talpacoti* (Temminck, 1811)**, Ruddy Ground-Dove
Figure 2C

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°44′23″S, 042°28′52″W; 21°41′30″S, 042°28′47″W; 21°45′21″S, 042°27′01″W; 21°46′10″S, 042°26′35″W; 21°44′01″S, 042°27′09″W; 21°43′11″S, 042°28′02″W; 21°46′07″S, 042°27′11″W; 21°44′33″S, 042°27′41″W; 21°46′52″S, 042°28′12″W; 21°44′6″S, 042°33′14″W; first record on 30.III.2013; obs.; multiple (♂ and ♀).

Identification. Small dove. Predominantly brown. Males have bright ruddy plumage whereas females are paler, with tones tending more towards brown than ruddy.

Order Cuculiformes
Family Cuculidae

***Guira guira* (Gmelin, 1788)**, Guira Cuckoo

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°44′23″S, 042°28′52″W; 21°41′30″S, 042°28′47″W; 21°45′21″S, 042°27′01″W; 21°46′10″S, 042°26′35″W; 21°44′01″S, 042°27′09″W;

21°43′11″S, 042°28′02″W; 21°46′07″S, 042°27′11″W; 21°44′33″S, 042°27′41″W; 21°46′52″S, 042°28′12″W; 21°44′6″S, 042°33′14″W; first record on 30.III.2013; obs.; multiple (no sexual dimorphism).

Identification. Shaggy-looking above, back and wings white-streaked brown, with short orange-rufous crest.

***Crotophaga major* Gmelin, 1788**, Greater Ani
Figure 2D

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°44′23″S, 042°28′52″W; 21°41′30″S, 042°28′47″W; 21°45′21″S, 042°27′01″W; 21°44′33″S, 042°27′41″W; 21°44′6″S, 042°33′14″W; first record on 03.VII.2016; obs.; multiple (no sexual dimorphism).

Identification. Overall glossy black. Breast and wing feathers glossy blue-green, back feathers broadly edged with bronze-green. Iris white to greenish-yellow, outer ring of iris changes to lime-green when stressed.

***Crotophaga ani* Linnaeus, 1758**, Smooth-billed Ani
Figure 2E

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°44′23″S, 042°28′52″W; 21°41′30″S, 042°28′47″W; 21°45′21″S, 042°27′01″W; 21°46′10″S, 042°26′35″W; 21°44′01″S, 042°27′09″W; 21°43′11″S, 042°28′02″W; 21°46′07″S, 042°27′11″W; 21°44′33″S, 042°27′41″W; 21°46′52″S, 042°28′12″W; 21°44′6″S, 042°33′14″W; first record on 30.III.2013; obs.; multiple (no sexual dimorphism).

Identification. Entirely blackish. Iris black. Smaller than *C. major*.

***Tapera naevia* (Linnaeus, 1766)**, Striped Cuckoo

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°44′23″S, 042°28′52″W; 21°41′30″S, 042°28′47″W; 21°46′10″S, 042°26′35″W; 21°46′52″S, 042°28′12″W; 21°44′6″S, 042°33′14″W; first record on 30.III.2013; obs.; multiple (no sexual dimorphism).

Identification. Brown cuckoo. Short reddish-brown crest streaked with black. Long tail. Eyebrow white.

***Piaya cayana* (Linnaeus, 1766)**, Squirrel Cuckoo
Figure 2F

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°42′15″S, 042°30′27″W; 21°41′02″S, 042°27′17″W; 21°44′23″S, 042°28′52″W; 21°46′10″S, 042°26′35″W; 21°43′11″S, 042°28′02″W; 21°46′52″S, 042°28′12″W; 21°44′6″S, 042°33′14″W; first record on 17.VIII.2013; obs.; 10 (no sexual dimorphism).

Identification. Upperparts rufous brown, belly light grey. Very long tail.

Order Caprimulgiformes
Family Caprimulgidae

***Nyctidromus albicollis* (Gmelin, 1789)**, Common Pauraque

Observations. BRAZIL – Minas Gerais • Estrela Dalva; 21°43′11″S, 042°28′02″W; 17.VIII.2013; obs.; 3 ♂.

Identification. All plumage cryptic, rendering birds inconspicuous when perched on ground or log. Male has white wing bands across primaries.

Order Apodiformes
Family Apodidae

***Streptoprocne zonaris* (Shaw, 1796)**, White-collared Swift

Observations. BRAZIL – Minas Gerais • Estrela Dalva; 21°44′23″S, 042°28′52″W; 15.VII.2018; obs.; multiple (no sexual dimorphism).

Identification. Largest species of swift within the study area. Overall colour sooty black, except for broad band of white feathers circling the neck.

***Chaetura meridionalis* Hellmayr, 1907**, Sick's Swift

Observations. BRAZIL – Minas Gerais • Estrela Dalva; 21°44′23″S, 042°28′52″W; 21°45′21″S, 042°27′01″W; 21°44′33″S, 042°27′41″W; first record on 25.XII.2016; obs.; multiple (no sexual dimorphism).

Identification. Medium-sized swift. Adult has lores, forehead, crown, and ear-coverts grey-brown glossed with olive. Black eye-patch. Pale grey-brown throat.

Family Trochilidae

***Florisuga fusca* (Vieillot, 1817)**, Black Jacobin

Observations. BRAZIL – Minas Gerais • Estrela Dalva; 21°43′55″S, 042°29′27″W; 30.III.2013; obs.; 2 (no sexual dimorphism).

Identification. Predominantly black with flanks white. Central tail feathers black, the rest white with black tips. Juveniles have broad cinnamon band on sides of throat.

***Phaethornis ruber* (Linnaeus, 1758)**, Reddish Hermit
Figure 3A

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°41′02″S, 042°27′17″W; 21°46′59″S, 042°29′42″W; first record on 08.I.2017; obs.; 1 ♂ and 1 ♀.

Identification. A small hermit hummingbird with dark green upperparts and cinnamon-rufous underparts. Males distinguished from females by presence of dark feathers forming a patch or band on the breast.

***Phaethornis pretrei* (Lesson & Delattre, 1839)**, Planalto Hermit

Observations. BRAZIL – Minas Gerais • Estrela Dalva; 21°43′55″S, 042°29′27″W; 21°44′23″S, 042°28′52″W; 21°45′21″S, 042°27′01″W; first record on 23.XII.2014; obs.; 6 (no sexual dimorphism).

Identification. Medium-sized hermit. Olive-green upper parts; prominent reddish upper tail-coverts with prominent white tips.

***Colibri serrirostris* (Vieillot, 1816)**, White-vented Violetear

Observations. BRAZIL – Minas Gerais • Volta Grande; 21°46′52″S, 042°28′12″W; 08.I.2017; obs.; 1 ♂.

Identification. Male is greenish with shades of purple on the breast and wingtips, with violet ears. Female similar to male but slightly smaller, paler, and more greyish green.

***Chlorostilbon lucidus* (Shaw, 1812)**, Glittering-bellied Emerald
Figure 3B

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°44′23″S, 042°28′52″W; 21°43′11″S, 042°28′02″W; 21°44′33″S, 042°27′41″W; 21°44′6″S, 042°33′14″W first record on 31.III.2013; obs.; multiple (♂ and ♀).

Identification. Male has short, straight red bill with a black tip. Upperparts slightly gold-green, belly iridescent bronze to bronzy green. Female has all black bill, with upperparts slightly golden green and underparts whitish changing to pale brownish grey on breast and belly.

***Thalurania glaucopis* (Gmelin, 1788)**, Violet-capped Woodnymph

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°42′15″S, 042°30′27″W; 21°41′02″S, 042°27′17″W; 21°46′59″S, 042°29′42″W; first record on 23.XII.2014; obs.; multiple (♂ and ♀).

Identification. Male has straight, almost blackish bill; cap glittering violet-blue. Upperparts dark gold-en-green; underparts brilliant green. Female lacks contrasting cap; underparts, including undertail-coverts, dirty white to pale buff.

***Eupetomena macroura* (Gmelin, 1788)**, Swallow-tailed Hummingbird
Figure 3C

Observations. BRAZIL – Minas Gerais • Estrela Dalva; 21°44′23″S, 042°28′52″W; 21°44′33″S, 042°27′41″W; first record on 30.III.2013; obs.; 7 (no sexual dimorphism).

Identification. Slightly curved black bill. Upperparts and underparts blue-green or shining bronzy green; head, throat, and breast deep violet-blue. Deeply forked blue tail is diagnostic.

***Chionomesa lactea* (Lesson, 1832)**, Sapphire-spangled Emerald

Observations. BRAZIL – Minas Gerais • Estrela Dalva; 21°44′33″S, 042°27′41″W; 07.I.2017; obs.; 1 ♂.

Identification. Male has crown, neck, and flanks bronze-green; rest of upperparts gold- to bronze-green; throat, upper breast glittering violet-blue. Female has more greyish throat.

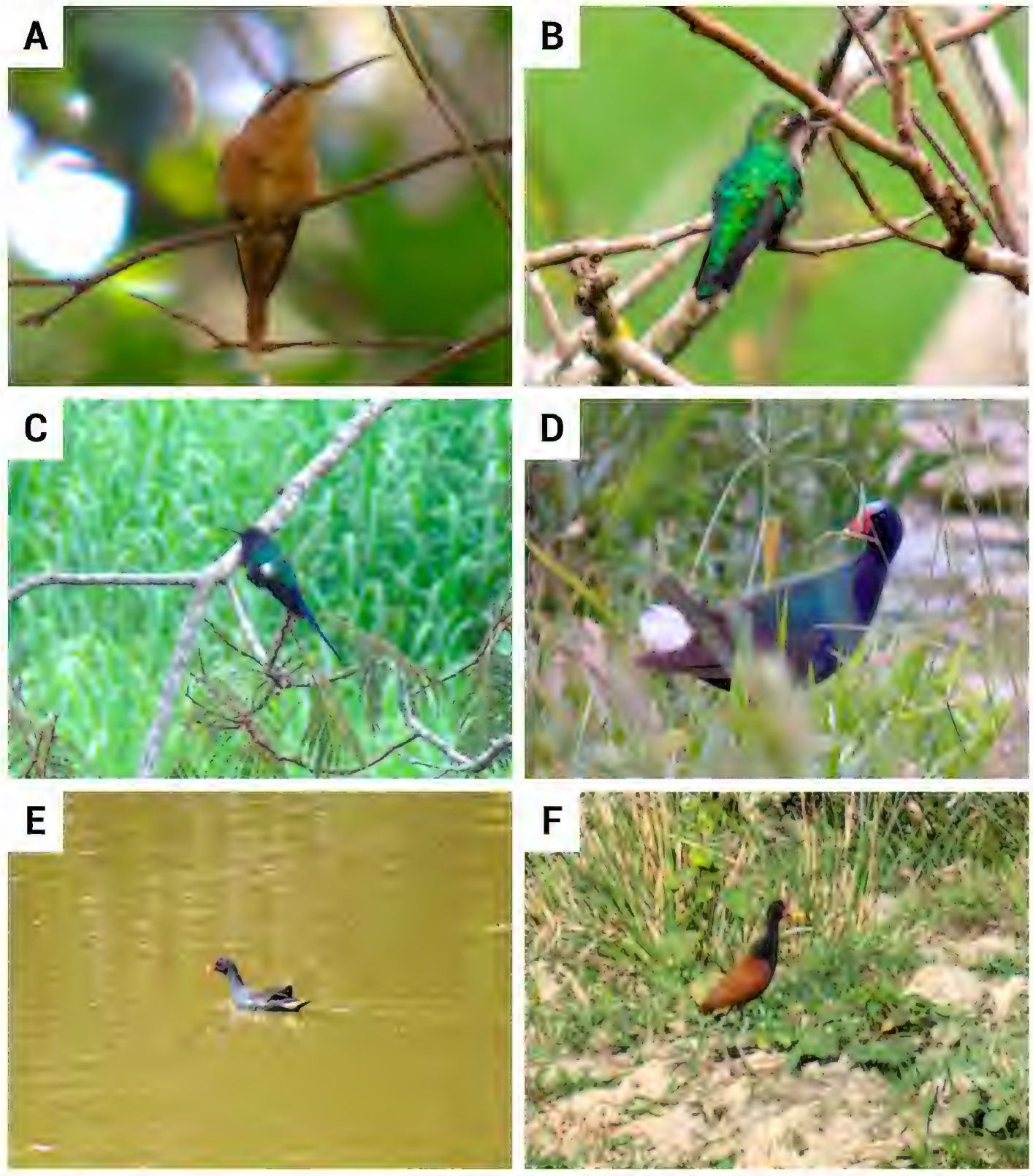

Figure 3. Bird species recorded in the study area. **A.** *Phaethornis ruber*. **B.** *Chlorostilbon lucidus*. **C.** *Eupetomena macroura*. **D.** *Porphyrio martinica*. **E.** *Gallinula galeata*. **F.** *Jacana jacana*.

Order Gruiformes
Family Aramidae

***Aramus guarauna* (Linnaeus, 1766)**, Limpkin

Observations. BRAZIL – Minas Gerais • Estrela Dalva; 21°44′28″S, 042°28′36″W; 15.VII.2018; obs.; 1 (no sexual dimorphism).

Identification. Similar to an Ibis. Identified by its long neck, large size, bill yellowish, and plumage is uniform dark olive-brown with white markings.

Family Rallidae

***Porphyrio martinica* (Linnaeus, 1766)**, Purple Gallinule
Figure 3D

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°41′56″S, 042°28′47″W; 21°44′10″S, 042°33′22″W; first record on 24.XII.2015; obs.; 1 (no sexual dimorphism).

Identification. Underparts glossy purple, upperparts olive-green. Red bill with yellow tip, legs yellowish.

***Aramides saracura* (Spix, 1825)**, Slaty-breasted Wood Rail

Observations. BRAZIL – Minas Gerais • Estrela Dalva; 21°44′28″S, 042°28′36″W; 15.VII.2018; obs.; 2 (no sexual dimorphism).

Identification. Grey head and neck extending to belly with upperparts brown. Differs from all congeners in having bill green with bluish base.

***Gallinula galeata* (Lichtenstein, 1818)**, Common Gallinule
Figure 3E

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°46′24″S, 042°27′07″W; 21°45′36″S, 042°27′15″W; 21°4410″S, 042°33′22″W; first record on 07.I.2017; obs.; multiple (no sexual dimorphism).

Identification. Predominantly black. Bill and large frontal shield bright red; bill tip yellow. Legs bright yellow.

Order Charadriiformes
Family Charadriidae

***Vanellus chilensis* (Molina, 1782)**, Southern Lapwing

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°44′28″S, 042°28′36″W; 21°44′23″S, 042°28′52″W; 21°45′21″S, 042°27′01″W; 21°43′11″S, 042°28′02″W; 21°46′52″S, 042°28′12″W; 21°44′6″S, 042°33′14″W; first record on 30.III.2013; obs.; multiple (no sexual dimorphism).

Identification. Identified by filamentous crest; breast and forehead black, legs pale red.

Family Scolopacidae

***Gallinago paraguaiae* (Vieillot, 1816)**, South American Snipe

Observations. BRAZIL – Minas Gerais • Estrela Dalva; 21°41′30″S, 042°28′47″W; 17.VIII.2013; obs.; multiple (no sexual dimorphism).

Identification. Neck, breast, and flanks barred, while center of belly is white and unbarred. Distinctively long bill.

Family Jacanidae

***Jacana jacana* (Linnaeus, 1766)**, Wattled Jacana
Figure 3F

Observations. BRAZIL – Minas Gerais • Estrela Dalva; 21°41′56″S, 042°28′47″W; 21°44′28″S, 042°28′36″W; first record on 17.VIII.2013; obs.; 4 (no sexual dimorphism).

Identification. Red bi-lobed frontal comb and conspicuous rictal lappets contrasting with yellow bill and black head. Legs and toes very long, remiges yellow in flight.

Order Pelecaniformes
Family Ardeidae

***Nycticorax nycticorax* (Linnaeus, 1758)**, Black-crowned Night-Heron

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°46′24″S, 042°27′07″W; 21°44′23″S, 042°28′52″W; 21°47′10″S, 042°27′58″W; first record on 15.VII.2018; obs.; 2 (no sexual dimorphism).

Identification. Black cap, upper back, and scapulars. Grey wings. White head and neck sides, white to pale grey underparts.

***Butorides striata* (Linnaeus, 1758)**, Striated Heron

Observations. BRAZIL – Minas Gerais • Estrela Dalva; 21°45′37″S, 042°27′15″W; 21°44′23″S, 042°28′52″W; first record on 26.XII.2018; obs.; 2 (no sexual dimorphism).

Identification. Grey cap. Plumage bluish grey with a rufous and white streak on breast.

***Bubulcus ibis* (Linnaeus, 1758)**, Cattle Egret

Observations. BRAZIL – Minas Gerais • Estrela Dalva; 21°44′23″S, 042°28′52″W; 21°41′30″S, 042°28′47″W; 21°45′21″S, 042°27′01″W; 21°44′01″S, 042°27′09″W; 21°43′11″S, 042°28′02″W; 21°46′07″S, 042°27′11″W; 21°44′6″S, 042°33′14″W; first record on 30.III.2013; obs.; multiple (no sexual dimorphism).

Identification. Plumage generally white but has orange-buff plumes on the breast, head, and lower back during the breeding season.

***Ardea cocoi* Linnaeus, 1766**, Cocoi Heron

Observations. BRAZIL – Minas Gerais • Volta Grande; 21°47′10″S, 042°27′58″W; 08.I.2017; obs.; 1 (no sexual dimorphism).

Identification. Black hood, extending below the eyes and continuing with long crested plumes. Upperparts and wing-coverts grey; white neck with anterior vertical black stripes; white underparts, except the belly which is black. Eyes usually yellow, with blue lores; bill dull yellow, slightly paler below and with blackish base (becoming bright yellow, with reddish tinge in breeding season); legs and feet black (dusky pink in breeding season).

***Ardea alba* Linnaeus, 1758**, Great Egret
Figure 4A

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°41′43″S, 042°29′44″W; 21°44′23″S, 042°28′52″W; 21°43′11″S, 042°28′02″W; 21°47′10″S, 042°27′58″W; first record on 30.III.2013; obs.; 3 (no sexual dimorphism).

Identification. Plumage white. Long black legs and feet, long neck, and long, all-yellow bill.

***Syrigma sibilatrix* (Temminck, 1824)**, Whistling Heron

Observations. BRAZIL – Minas Gerais • Estrela Dalva; 21°44′23″S, 042°28′52″W; 16.II.2015; obs.; 1 (no sexual dimorphism).

Identification. Distinctive thick bill, which is pink with a black tip, and bright blue bare skin on the lores and surrounding the eyes.

***Pilherodius pileatus* (Boddaert, 1783)**, Capped Heron

Observations. BRAZIL – Minas Gerais • Estrela Dalva; 21°46′24″S, 042°27′07″W; 21°44′28″S, 042°28′36″W; first record on 11.II.2017; obs.; 2 (no sexual dimorphism).

Identification. Black cap and blue facial skin and bill. Feathers of neck usually yellowish white or light cream.

***Egretta thula* (Molina, 1782)**, Snowy Egret

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°45′37″S, 042°27′15″W; 21°41′43″S, 042°29′44″W; 21°44′28″S, 042°28′36″W; 21°47′10″S, 042°27′58″W; first record on 23.XII.2014; obs.; multiple (no sexual dimorphism).

Identification. Entirely white plumage. Long, slender black bill. Bright yellow bare skin in lores. Legs black with yellow feet.

Order Cathartiformes
Family Cathartidae

***Coragyps atratus* (Bechstein, 1793)**, Black Vulture
Figure 4B

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°44′23″S, 042°28′52″W; 21°41′30″S, 042°28′47″W; 21°45′21″S, 042°27′01″W; 21°46′10″S, 042°26′35″W; 21°44′01″S, 042°27′09″W; 21°43′11″S, 042°28′02″W; 21°46′07″S, 042°27′11″W; 21°44′33″S, 042°27′41″W; 21°46′52″S, 042°28′12″W; 21°44′6″S, 042°33′14″W; first record on 30.III.2013; obs.; multiple (no sexual dimorphism).

Identification. Plumage entirely black, except undersurface of primaries whitish with blackish tips.

***Cathartes aura* (Linnaeus, 1758)**, Turkey Vulture

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°44′23″S, 042°28′52″W; 21°41′30″S, 042°28′47″W; 21°46′52″S, 042°28′12″W; first record on 25.XII.2018; obs.; multiple (no sexual dimorphism).

Identification. Similar to *Coragyps atratus* and *Cathartes barrovianus* but distinguished by reddish head and neck.

***Cathartes burrovianus* Cassin, 1845**, Lesser Yellow-headed Vulture

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°41′30″S, 042°28′47″W; 21°46′ 10″S, 042°26′35″W; 21°47′10″S, 042°27′58″W; first record on 31.III.2013; obs.; 3 (no sexual dimorphism).

Identification. Differs from other vultures by its yellow bare skin on the head and neck.

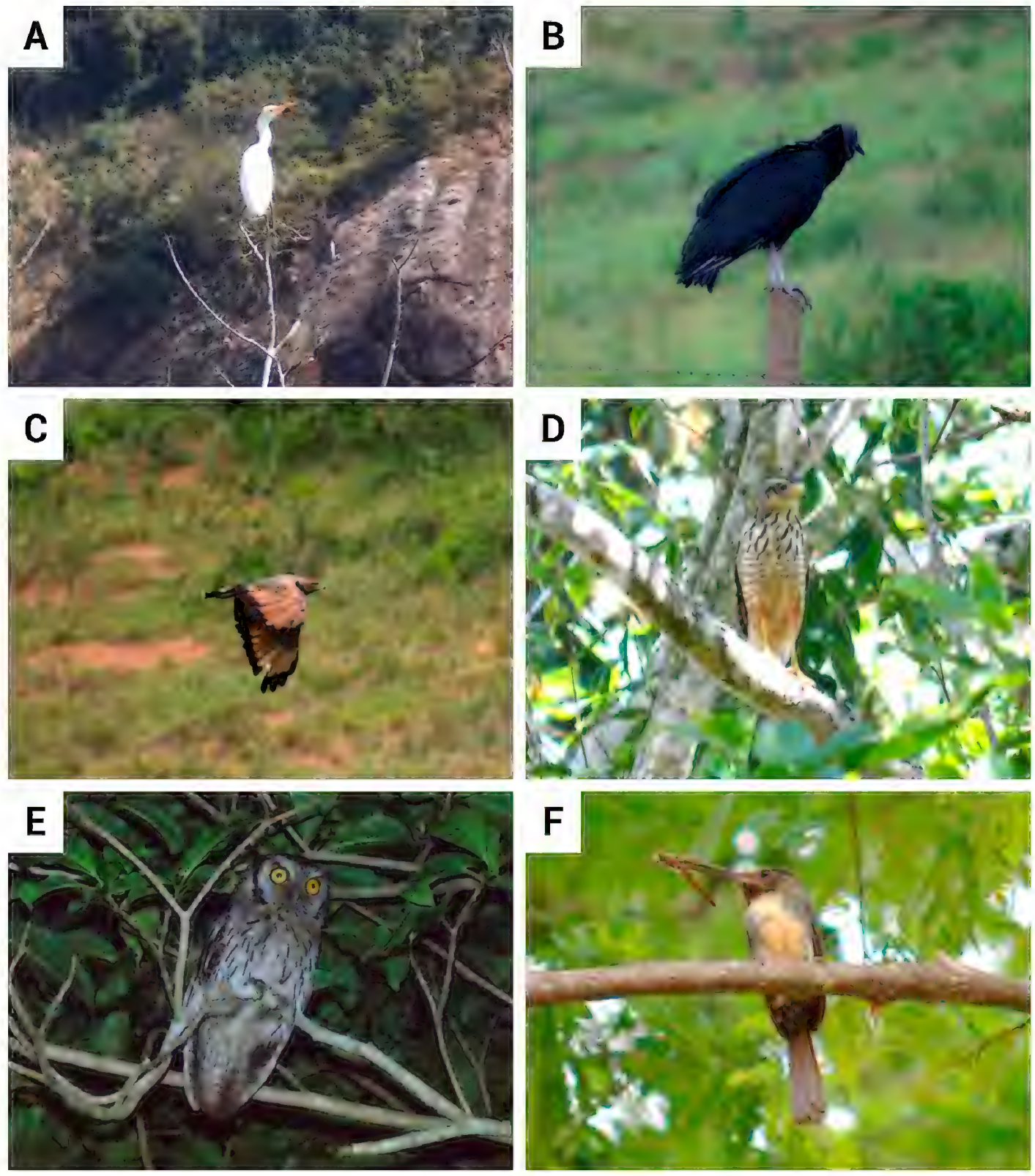

Figure 4. Bird species recorded in the study area. **A.** *Ardea alba*. **B.** *Coragyps atratus*. **C.** *Heterospizias meridionalis*. **D.** *Rupornis magnirostris*. **E.** *Megascops choliba*. **F.** *Jacamaralcyon tridactyla*.

Order Accipitriformes
Family Accipitridae

***Elanus leucurus* (Vieillot, 1818)**, White-tailed Kite

Observations. BRAZIL – Minas Gerais • Estrela Dalva; 21°44′23″S, 042°28′52″W; 23.XII.2014; obs.; 2 (no sexual dimorphism).

Identification. Adults have white underneath and grey on the back from crown to upper tail coverts, with red eyes.

***Accipiter striatus* Vieillot, 1808**, Sharp-shinned Hawk

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°46′59″S, 042°29′42″W; 08.I.2017; obs.; 1 sex indet.

Identification. Upperparts bluish; underparts white with rufous to tawny-buff barring; broad grey bars in tail; eye orange-red to red; cere and feet bright yellow. Female differs from the male by having a darker hood, upper flanks are brown, and the breast is less barred.

***Heterospizias meridionalis* (Latham, 1790)**, Savanna Hawk
Figure 4C

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°44′23″S, 042°28′52″W; 21°44′01″S, 042°27′09″W; 21°43′11″S, 042°28′02″W; 21°44′6″S, 042°33′14″W; first record on 30.III.2013; obs.; 6 (no sexual dimorphism).

Identification. Predominantly cinnamon-brown. Hindneck streaked, back fuscous-brown edged rufous; underparts finely black barred, except on throat.

***Rupornis magnirostris* (Gmelin, 1788)**, Roadside Hawk
Figure 4D

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°44′23″S, 042°28′52″W; 21°41′30″S, 042°28′47″W; 21°45′21″S, 042°27′01″W; 21°44′01″S, 042°27′09″W; 21°43′11″S, 042°28′02″W; 21°46′52″S, 042°28′12″W; 21°44′6″S, 042°33′14″W; first record on 30.III.2013; obs.; multiple (no sexual dimorphism).

Identification. Head, upperparts, and upper breast grey, with breast and belly barred tawny or cinnamon-rufous. Cere and iris yellow.

***Geranoaetus albicaudatus* (Vieillot, 1816)**, White-tailed Hawk

Observations. BRAZIL – Minas Gerais • Estrela Dalva; 21°44′23″S, 042°28′52″W; 23.XII.2014; obs.; 1 (no sexual dimorphism).

Identification. Identified by an unmistakable short triangular white tail with a broad black subterminal band. Light to dark neutral grey upperparts and white breast and abdomen.

***Buteo brachyurus* Vieillot, 1816**, Short-tailed Hawk

Observations. BRAZIL – Minas Gerais • Estrela Dalva; 21°41′30″S, 042°28′47″W; 15.VII.2018; obs.; 1 (no sexual dimorphism).

Identification. Adults have head and upperparts dark, with contrasting underparts white in the light-morph. Dark-morph has body, head, and wing coverts almost entirely dark brown.

Order Strigiformes
Family Strigidae

***Megascops choliba* (Vieillot, 1817)**, Tropical Screech Owl
Figure 4E

Observations. BRAZIL – Minas Gerais • Estrela Dalva; 21°44′23″S, 042°28′52″W; 21°44′33″S, 042°27′41″W; first record on 27.XII.2013; obs.; 2 (no sexual dimorphism).

Identification. Underparts generally pale, but with many short, black streaks, with numerous narrower cross bars. Short ear tufts and yellow irises. Tropical Screech Owls have different morphs, but the most common is the grey-brown morph.

***Glaucidium brasilianum* (Gmelin, 1788)**, Ferruginous Pygmy Owl

Observations. BRAZIL – Minas Gerais • Volta Grande; 21°46′59″S, 042°29′42″W; 08.I.2017; obs.; 2 (no sexual dimorphism).

Identification. Species has two plumage colours. Grey form with white-striped tail and light chest edged with grey (the dominant colour of all plumage). Reddish brown morph with tail the same colour and almost indistinguishable white bands. In both cases, have highlighted white eyebrow. On back of the neck, has unique feathers, forming as if they were two eyes.

***Athene cunicularia* (Molina, 1782)**, Burrowing Owl

Observations. BRAZIL – Minas Gerais • Estrela Dalva; 21°43′11″S, 042°28′02″W; 17.VIII.2013; obs.; 2 (no sexual dimorphism).

Identification. Upperparts dark brown with buffy-white barring. Underparts buffy-white with broad brown barring on both sides. Iris usually bright, lemon yellow.

Order Trogoniformes
Family Trogonidae

***Trogon surrucura* Vieillot, 1817**, Surucua Trogon

Observations. BRAZIL – Minas Gerais • Volta Grande; 21°46′59″S, 042°29′42″W; 08.I.2017; obs.; 1 sex indet.

Identification. Two subspecies, *Trogon surrucura surrucura* and *Trogon surrucura aurantius*. In the first, male has royal blue crown, neck and breast; black cheeks and throat; coppery green back turning to turquoise green on the tail; rosy red belly. Females dull grey above with distinctive narrow white bars on the wing panels and black undertail coverts. The other subspecies differs by having an orange instead of a rosy red belly. Second subspecies occurs in the study region.

Order Coraciiformes
Family Alcedinidae

***Megaceryle torquata* (Linnaeus, 1766)**, Ringed Kingfisher

Observations. BRAZIL – Minas Gerais • Estrela Dalva; 21°46′24″S, 042°27′07″W; 21°41′43″S, 042°29′44″W; 21°44′10″S, 042°33′22″W; first record on 16.II.2015; obs.; multiple (♂ and ♀).

Identification. Upperparts and wings bluish grey, except for blackish flight feathers. Sexes distinguished by colour of underparts; male has uniformly rusty brown underparts, except white undertail coverts and white throat; female has bluish grey band on upper breast with narrow whitish band separating it from the rufous belly.

***Chloroceryle amazona* (Latham, 1790)**, Amazon Kingfisher

Observations. BRAZIL – Minas Gerais • Estrela Dalva; 21°46′24″S, 042°27′07″W; 21°41′56″S, 42°28′47″W; 30.III.2013; obs.; 1 ♂.

Identification. Male dark bronzy green upperparts except for white collar and small white marks in front of and below eye. Breast rich rufous with dark green sides, belly white. Female like male, but white breast with bottle-green sides almost meeting in mid-line.

***Chloroceryle americana* (Gmelin, 1788)**, Green Kingfisher

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°46′24″S, 042°27′07″W; 21°45′37″S, 042°27′15″W; 21°44′10″S, 042°33′22″W; first record on 13.IV.2019; obs.; 2 ♂.

Identification. Upperparts green with white spotting and underparts white with green spots on sides and flanks. Male has white collar and rufous breast, while female has white collar, buffy throat and breast, and speckled green bands across breast and uppermost belly.

Order Galbuliformes
Family Galbulidae

***Jacamaralcyon tridactyla* (Vieillot, 1817)**, Three-toed Jacamar
Figure 4F

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°46′24″S, 042°27′07″W; 21°43′55″S, 042°29′27″W; 21°42′15″S, 042°30′27″W; 21°44′23″S, 042°28′52″W; 21°45′21″S, 042°27′01″W; 21°46′10″S, 042°26′35″W; 21°46′59″S, 042°29′42″W; 21°46′52″S, 042°28′12″W; 21°44′6″S, 042°33′14″W; first record on 16.II.2015; obs.; multiple (no sexual dimorphism).

Identification. Identified by thin golden-buff stripes on forehead, lores and throat. More blackish brown on throat, back and graduated tail uniform blackish, glossed with green; central breast and belly white, sides of abdomen clear grey.

Family Bucconidae

***Nystalus chacuru* (Vieillot, 1816)**, White-eared Puffbird
Figure 5A

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°44′23″S, 042°28′52″W; 21°41′30″S, 042°28′47″W; 21°45′21″S, 042°27′01″W; 21°43′11″S, 042°28′02″W; 21°46′52″S, 042°28′12″W; first record on 08.I.2017; obs.; multiple (no sexual dimorphism).

Identification. Upperparts predominantly dark brown with barred effect. Underparts predominantly white. Large black patch mainly on lower ear-coverts. Dark brown crown variably spotted and barred dull rufous, and a reddish bill.

Order Piciformes
Family Ramphastidae

***Ramphastos toco* Statius Müller, 1776**, Toco Toucan
Figure 5B

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°44′23″S, 042°28′52″W; 21°41′30″S, 042°28′47″W; 21°45′21″S, 042°27′01″W; 21°44′33″S, 042°27′41″W; 21°46′52″S, 042°28′12″W; 21°44′6″S, 042°33′14″W; first record on 16.II.2015; obs.; multiple (no sexual dimorphism).

Identification. The largest of the toucans. Identified by their enormous reddish orange bill, which is tipped with black.

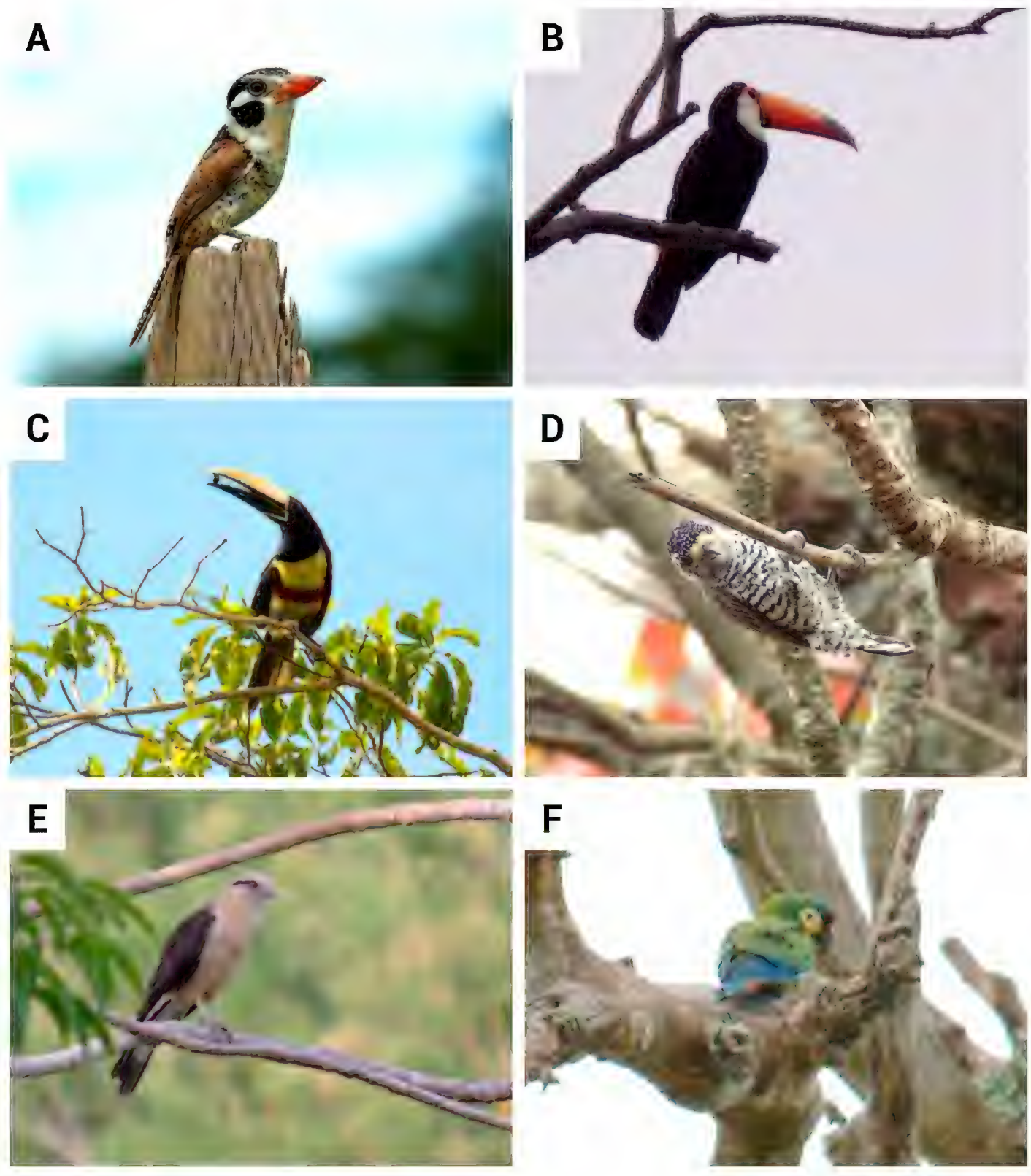

Figure 5. Bird species recorded in the study area. **A.** *Nystalus chacuru*. **B.** *Ramphastos toco*. **C.** *Pteroglossus aracari*. **D.** *Picumnus cirratus*. **E.** *Milvago chimachima*. **F.** *Primolius maracana*.

***Ramphastos dicolorus* Linnaeus, 1766**, Red-breasted Toucan

Observations. BRAZIL – Minas Gerais • Estrela Dalva; 21°42′15″S, 042°30′27″W; 17.VIII.2013; obs.; 1 (no sexual dimorphism).

Identification. Broad red area on lower breast, tip yellow. Bill mainly green to green-yellow, with black basal line and some red above the tomial tooth. Red facial skin, blue to yellow-green around eye.

***Pteroglossus aracari* (Linnaeus, 1758)**, Black-necked Aracari
Figure 5C

Observations. BRAZIL – Minas Gerais • Estrela Dalva; 21°44′23″S, 042°28′52″W; 25.XII.2016; obs.; 2 (no sexual dimorphism).

Identification. Green above with red rump. Yellow below, with broad red band across lower breast, thighs greenish. Bill ivory with black culmen and mandible; facial-orbital skin blue-grey to black.

Family Picidae

***Picumnus cirratus* Temminck, 1825**, White-barred Piculet
Figure 5D

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°43′55″S, 042°29′27″W; 21°42′15″S, 042°30′27″W; 21°41′02″S, 042°27′17″W; 21°44′23″S, 042°28′52″W; 21°41′30″S, 042°28′47″W; 21°45′21″S, 042°27′01″W; 21°46′10″S, 042°26′35″W; 21°44′01″S, 042°27′09″W; 21°43′11″S, 042°28′02″W; 21°46′07″S, 042°27′11″W; 21°44′33″S, 042°27′41″W; 21°46′59″S, 042°29′42″W; 21°46′52″S, 042°28′12″W; 21°44′6″S, 042°33′14″W; first record on 17.VIII.2013; obs.; multiple (♂ and ♀).

Identification. Male has black forehead to nape, crown feathers with broad red tips often forming solid patch; chin and throat white to pale buff, barred blackish. Female lacks red tips on crown feathers.

***Melanerpes candidus* (Otto, 1796)**, White Woodpecker

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°44′23″S, 042°28′52″W; 21°41′30″S, 042°28′47″W; 21°44′6″S, 042°33′14″W; first record on 23.XII.2014; obs.; multiple (no sexual dimorphism).

Identification. Predominantly white, except for wings, back, and tail. This species has a very broad golden-yellow orbital ring.

***Campephilus robustus* (Lichtenstein, 1818)**, Robust Woodpecker

Observations. BRAZIL – Minas Gerais • Volta Grande; 21°46′59″S, 042°29′42″W; 08.I.2017; obs.; 2 ♂.

Identification. All-red head, pale and dark-barred underparts, largely black upperparts with a creamy-white rump and mantle. Males possess small white and black spot on ear covers, whereas females have a much more obvious pale stripe, outlined in black, reaching from the bill base to just behind and below the eyes.

***Dryocopus lineatus* (Linnaeus, 1766)**, Lineated Woodpecker

Observations. BRAZIL – Minas Gerais • Estrela Dalva; 21°41′02″S, 042°27′17″W; 26.XII.2014; obs.; 1 ♀.

Identification. Red crest and white stripes that run across its face and down the sides of the neck. Female is similar to adult male, but forecrown and malars are black.

***Colaptes melanochloros* (Gmelin, 1788)**, Green-barred Woodpecker

Observations. BRAZIL – Minas Gerais • Estrela Dalva; 21°43′55″S, 042°29′27″W; 21°42′15″S, 042°30′27″W; first record on 23.XII.2014; obs.; 2 ♂ and 1 ♀.

Identification. Red semi-crest on nape and white face. Upperparts light greenish with dark brown barring, rump paler and almost unbarred. Underparts whitish, golden tinge on breast, all with prominent black spots. Female similar to male but with proportionately longer tail and a mostly black malar with white streaks, without red.

***Colaptes campestris* (Vieillot, 1818)**, Campo Flicker

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°44′23″S, 042°28′52″W; 21°41′30″S, 042°28′47″W; 21°45′21″S, 042°27′01″W; 21°44′01″S, 042°27′09″W; 21°46′52″S, 042°28′12″W; 21°44′6″S, 042°33′14″W; first record on 30.III.2013; obs.; multiple (♂ and ♀).

Identification. Sides of head, neck, and breast mainly yellow. Dorsal plumage brown, barred with dull white. Underparts and tail-coverts dull white, barred with brown. Crown black and malar red in male.

Order Cariamiformes
Family Cariamidae

***Cariama cristata* (Linnaeus, 1766)**, Red-legged Seriema

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°44′23″S, 042°28′52″W; 21°41′30″S, 042°28′47″W; 21°46′52″S, 042°28′12″W; first record on 30.III.2013; obs.; 4 (no sexual dimorphism).

Identification. Prominent loose tuft-like crest on forehead, red bill and very long salmon-coloured legs.

Order Falconiformes
Family Falconidae

***Caracara plancus* (Miller, 1777)**, Crested Caracara

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°44′23″S, 042°28′52″W; 21°41′30″S, 042°28′47″W; 21°45′21″S, 042°27′01″W; 21°46′10″S, 042°26′35″W; 21°44′01″S, 042°27′09″W; 21°44′33″S, 042°27′41″W; 21°46′52″S, 042°28′12″W; 21°44′6″S, 042°33′14″W; first record on 30.III.2013; obs.; multiple (no sexual dimorphism).

Identification. Distinguished by bright orange-red face, sky-blue bill, and sharply demarcated blackish, flattened crown that sweeps backwards into a crest.

***Milvago chimachima* (Vieillot, 1816)**, Yellow-headed Caracara
Figure 5E

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°44′23″S, 042°28′52″W; 21°41′30″S, 042°28′47″W; 21°45′21″S, 042°27′01″W; 21°44′01″S, 042°27′09″W; 21°43′11″S, 042°28′02″W;

21°46′52″S, 042°28′12″W; 21°44′6″S, 042°33′14″W; first record on 30.III.2013; obs.; multiple (no sexual dimorphism).

Identification. Head, neck, and underparts, buff to creamy yellowish white. Dark streak behind eye; iris reddish brown, bare skin around eyes bright yellow.

Order Psittaciformes
Family Psittacidae

***Pionus maximiliani* (Kuhl, 1820)**, Scaly-headed Parrot

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°43′55″S, 042°29′27″W; 21°42′15″S, 042°30′27″W; 21°44′23″S, 042°28′52″W; 21°41′30″S, 042°28′47″W; 21°44′33″S, 042°27′41″W; 21°46′59″S, 042°29′42″W; 21°46′52″S, 042°28′12″W; 21°44′6″S, 042°33′14″W; first record on 16.II.2015; obs.; multiple (no sexual dimorphism).

Identification. Nape and upperparts dark greenish bronze with dark edging on feathers giving scaled effect, but with lower back and wings dull green with less intense edging. Tail red basally with blue outer and green central feathers.

***Forpus xanthopterygius* (Spix, 1824)**, Blue-winged Parrotlet

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°43′55″S, 042°29′27″W; 21°41′02″S, 042°27′17″W; 21°44′23″S, 042°28′52″W; 21°41′30″S, 042°28′47″W; 21°45′21″S, 042°27′01″W; 21°46′07″S, 042°27′11″W; 21°44′33″S, 042°27′41″W; 21°46′52″S, 042°28′12″W; 21°44′6″S, 042°33′14″W ; first record on 05.I.2017; obs.; multiple (♂ and ♀).

Identification. Predominantly green, slightly lighter and yellower below. Bend of wing, primary and secondary-coverts, underwing-coverts, lower back and rump blue. Female replaces all blue with green.

***Primolius maracana* (Vieillot, 1816)**, Blue-winged Macaw
Figure 5F

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°43′55″S, 042°29′27″W; 21°41′02″S, 042°27′17″W; 21°44′23″S, 042°28′52″W; 21°41′30″S, 042°28′47″W; 21°45′21″S, 042°27′01″W; 21°46′07″S, 042°27′11″W; 21°44′33″S, 042°27′41″W; 21°46′52″S, 042°28′12″W; first record on 16.II.2015; obs.; multiple (no sexual dimorphism).

Identification. Identified by iris yellow not dark, forehead and patch on back red, tail above blue, reddish at base.

***Psittacara leucophthalmus* (Statius Müller, 1776)**, White-eyed Parakeet
Figure 6A

Observations. BRAZIL – Minas Gerais • Estrela Dalva; 21°43′55″S, 042°29′27″W; 21°42′15″S, 042°30′27″W; 21°41′02″S, 042°27′17″W; 21°44′23″S, 042°28′52″W; 21°41′30″S, 042°28′47″W; 21°45′21″S, 042°27′01″W; 21°46′10″S, 042°26′35″W; 21°44′01″S, 042°27′09″W; 21°43′11″S, 042°28′02″W; 21°46′07″S, 042°27′11″W; 21°44′33″S, 042°27′41″W; 21°46′59″S, 042°29′42″W; 21°46′52″S, 042°28′12″W; 21°44′6″S, 042°33′14″W; first record on 30.III.2013; obs.; multiple (no sexual dimorphism).

Identification. Predominately green with some red flecking on head and neck; bare orbital ring greyish white.

Order Passeriformes
Family Thamnophilidae

***Dysithamnus mentalis* (Temminck, 1823)**, Plain Antvireo

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°42′15″S, 042°30′27″W; 21°46′59″S, 042°29′42″W; first record on 17.VIII.2013; obs.; 3 sex indet.

Identification. Male has upperparts greyish-olive, concealed white interscapular patch; centre of belly yellow. Female differs from male in having crown cinnamon-tawny, upperparts and wings more olive (less grey), wing-covert tips and remex edgings olive-yellow, no white interscapular patch, yellow below more extensive.

***Thamnophilus palliatus* (Lichtenstein, 1823)**, Chestnut-backed Antshrike
Figure 6B

Observations. BRAZIL – Minas Gerais • Estrela Dalva; 21°44′23″S, 042°28′52″W; 21°44′33″S, 042°27′41″W; first record on 29.XII.2019; obs.; 2 ♂.

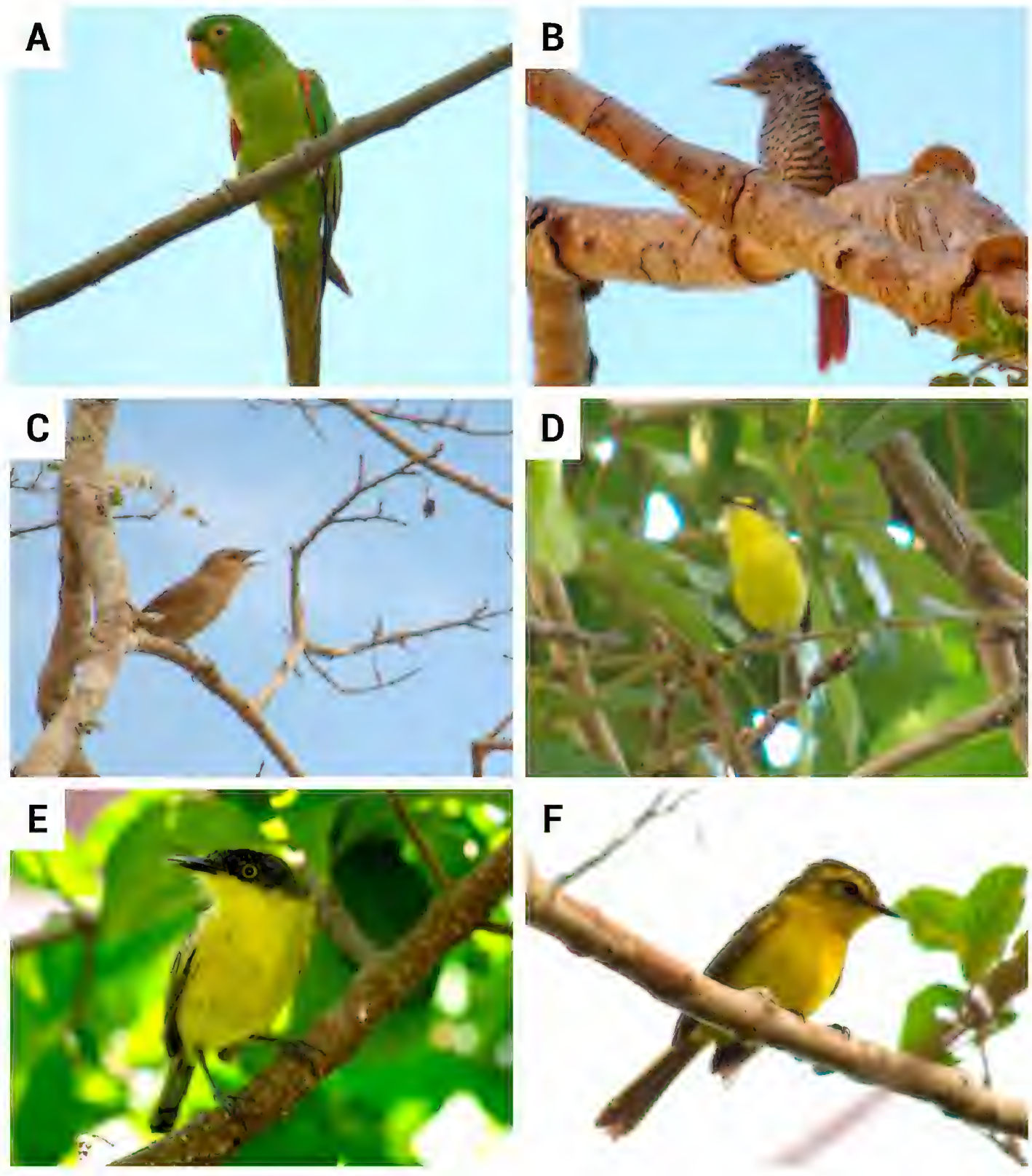

Figure 6. Bird species recorded in the study area. **A.** *Psittacara leucophthalmus*. **B.** *Thamnophilus palliatus*. **C.** *Phacellodomus rufifrons*. **D.** *Todirostrum poliocephalum*. **E.** *Todirostrum cinereum*. **F.** *Capsiempis flaveola*.

Identification. Male has black crown; upperparts, wings and tail rufous-brown; underparts striped black and white. Female is like male, but crown deep rufous-brown.

***Thamnophilus caerulescens* Vieillot, 1816**, Variable Antshrike

Observations. BRAZIL – Minas Gerais • Estrela Dalva; 21°42′15″S, 042°30′27″W; 21°46′59″S, 042°29′42″W; first record on 17.VIII.2013; obs.; 3 sex indet.

Identification. Male has forehead and crown black, underparts grey, belly paler. Two white wing bars. Female has crown and upperparts olive-brown with clay-coloured tinge.

***Drymophila squamata* (Lichtenstein, 1823)**, Scaled Antbird

Observations. BRAZIL – Minas Gerais • Volta Grande; 21°46′59″S, 042°29′42″W; 08.I.2017; obs.; 1 sex indet.

Identification. Male has black crown with white spots at side, broad white supercilium, black eyestripe; upperparts black, spotted white; wings black, wing-coverts broadly tipped white, tail black, barred white; head side, throat, and underparts white, spotted black. Female is patterned like male, but upperparts dark brown and buff, flanks, and crissum pale cinnamon.

Family Conopophagidae

***Conopophaga melanops* (Vieillot, 1818)**, Black-cheeked Gnateater

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°43′55″S, 042°29′27″W; 21°42′15″S, 042°30′27″W; 21°46′59″S, 042°29′42″W; first record on 17.VIII.2013; obs.; 3 ♂ and 2 ♀.

Identification. Male has rufous cap with orangish border, black forehead, and facial mask. The female does not have a black mask, but a grey post-ocular stripe and reddish-orange plumage with a lighter throat and belly.

Family Formicariidae

***Formicarius colma* Boddaert, 1783**, Rufous-capped Antthrush

Observations. BRAZIL – Minas Gerais • Volta Grande; 21°46′59″S, 042°29′42″W; 08.I.2017; obs.; 1 sex indet.

Identification. In southeastern Brazil, the subspecies *Formicarius colma ruficeps* occurs. This species has rufous crown and nape. Compared to the others subspecies, *Formicarius c. ruficeps* has more extensive rufous colour on head. Back, rump, and wings olive-brown; tail dusky brown; sides of head and neck black, throat and upper breast black, merging into dark grey on lower breast; belly and flanks paler grey, sometimes with brown wash; iris brown; bill black; tarsus light grey-brown to purplish-grey.

Family Scleruridae

***Sclerurus scansor* (Ménétries, 1835)**, Rufous-breasted Leaftosser

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°42′15″S, 042°30′27″W; 21°46′59″S, 042°29′42″W; first record on 23.XII.2014; obs.; 2 (no sexual dimorphism).

Identification. Entirely dark brown. Iris dark brown. Maxilla black, mandible black with whitish base. Tarsus and toes blackish brown.

Family Dendrocolaptidae

***Sittasomus griseicapillus* (Vieillot, 1818)**, Olivaceous Woodcreeper

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°43′55″S, 042°29′27″W; 21°42′15″S, 042°30′27″W; 21°41′02″S, 042°27′17″W; 21°46′59″S, 042°29′42″W; first record on 23.XII.2014; obs.; 7 (no sexual dimorphism).

Identification. The plumage lacks streaks and spots. Generally, the forehead, crown, auriculars, and nape are olive, olive-yellow, or brown, with the lores and supercilia slightly paler than the crown. The irises are dark brown to reddish brown.

***Xiphorhynchus fuscus* (Vieillot, 1818)**, Lesser Woodcreeper

Observations. BRAZIL – Minas Gerais • Volta Grande; 21°46′59″S, 042°29′42″W; 08.I.2017; obs.; 1 (no sexual dimorphism).

Identification. Broad creamy to yellowish-buff supercilium, contrasting with well-defined dusky patch on ear-coverts; crown and nape blackish brown, forehead and crown with small but prominent yellowish-buff to cinnamon spots, becoming more streak-like on nape and side of neck; streaks of nape extending to upper back; unmarked creamy-yellow throat; maxilla blackish brown to dark horn, mandible pinkish to white, sometimes darker tip; legs and feet olive-grey to bluish grey.

***Lepidocolaptes angustirostris* (Vieillot, 1818)**, Narrow-billed Woodcreeper

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°41′30″S, 042°28′47″W; 21°44′6″S, 042°33′14″W; 17.VIII.2013; obs.; 1 sex indet.

Identification. Rump, wings, and tail rufous-chestnut. Throat and cheeks whitish and unmarked, these blending into breast and belly. Crown and nape blackish-brown with oblong, whitish-buff streaks. Iris brown to chestnut. Bill pale grey.

Family Xenopidae

***Xenops rutilans* Temminck, 1821**, Streaked Xenops

Observations. BRAZIL – Minas Gerais • Volta Grande; 21°46′59″S, 042°29′42″W; 08.I.2017; obs.; 1 (no sexual dimorphism).

Identification. Conspicuous pale buff supercilium and blackish-brown postocular band; malar streak gleaming white, emphasized by dark brownish borders; crown dark brown with conspicuous rufous shafts streaks; back rufescent brown with inconspicuous paler rufous streaks; throat and centre of uppermost breast whitish, mottled; rest of breast and belly with broad buffy whitish streaks outlined with dark brownish; upper mandible dark brown to blackish, lower mandible whitish to pinkish-grey, often with blackish tip.

Family Furnariidae

***Furnarius figulus* (Lichtenstein, 1823)**, Wing-banded Hornero

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°44′23″S, 042°28′52″W; 21°41′30″S, 042°28′47″W; 21°45′21″S, 042°27′01″W; 21°44′01″S, 042°27′09″W; 21°43′11″S, 042°28′02″W; 21°44′6″S, 042°33′14″W; first record on 30.III.2013; obs.; multiple (no sexual dimorphism).

Identification. Conspicuous whitish supercilium extending to nape side, dingy rufous loral area, dark eyestripe, dull rufous auriculars, tawny-buff malar region. Crown chestnut-rufous, back, rump and uppertail-coverts slightly pale.

***Furnarius rufus* (Gmelin, 1788)**, Rufous Hornero

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°44′23″S, 042°28′52″W; 21°41′30″S, 042°28′47″W; 21°45′21″S, 042°27′01″W; 21°46′10″S, 042°26′35″W; 21°44′01″S, 042°27′09″W; 21°46′07″S, 042°27′11″W; 21°44′33″S, 042°27′41″W; 21°46′52″S, 042°28′12″W; 21°44′6″S, 042°33′14″W; first record on 30.III.2013; obs.; multiple (no sexual dimorphism).

Identification. Upperparts brown while underparts are light brown. This species has a poorly defined light rufous supercilium and rufous iris.

***Phacellodomus rufifrons* (Wied, 1821)**, Rufous-fronted Thornbird
Figure 6C

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°44′23″S, 042°28′52″W; 21°41′30″S, 042°28′47″W; 21°45′21″S, 042°27′01″W; 21°46′10″S, 042°26′35″W; 21°44′01″S, 042°27′09″W; 21°43′11″S, 042°28′02″W; 21°46′07″S, 042°27′11″W; 21°46′52″S, 042°28′12″W; 21°44′6″S, 042°33′14″W; first record on 17.VIII.2013; obs.; multiple (no sexual dimorphism).

Identification. Adult has dull brown upperparts, slightly darker eyestripe, pale throat and dirty buff-white underparts.

***Certhiaxis cinnamomeus* (Gmelin, 1788)**, Yellow-chinned Spinetail

Observations. BRAZIL – Minas Gerais • Estrela Dalva; 21°45′37″S, 042°27′15″W; 21°44′28″S, 042°28′36″W; 21°44′23″S, 042°28′52″W; 21°45′21″S, 042°27′01″W; first record on 30.III.2013; obs.; multiple (no sexual dimorphism).

Identification. Upperparts reddish and underparts whitish. Crown reddish-brown. Chin and centre of upper throat pale yellow, rest of throat white.

***Synallaxis ruficapilla* Vieillot, 1819**, Rufous-capped Spinetail

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°43′55″S, 042°29′27″W; 21°42′15″S, 042°30′27″W; 21°41′02″S, 042°27′17″W; 21°46′59″S, 042°29′42″W; first record on 23.XII.2014; obs.; 6 (no sexual dimorphism).

Identification. Broad buff supercilium contrasting strongly with dark brownish-grey lores and auriculars. Crown and hindneck bright orange-rufous, forehead slightly paler, wings mostly chestnut-brown.

***Synallaxis spixi* Sclater, 1856**, Spix's Spinetail

Observations. BRAZIL – Minas Gerais • Estrela Dalva; 21°43′55″S, 042°29′27″W; 21°42′15″S, 042°30′27″W; first record on 23.XII.2014; obs.; 2 (no sexual dimorphism).

Identification. Primarily dark olive-brown above and grey below, with contrasting bright rufous crown and wing coverts and a black throat.

***Synallaxis albescens* Temminck, 1823**, Pale-breasted Spinetail

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°44′23″S, 042°28′52″W; 21°41′30″S, 042°28′47″W; 21°46′52″S, 042°28′12″W; first record on 15.VII.2018; obs.; 2 (no sexual dimorphism).

Identification. Pale brownish-grey face with weakly defined pale eyeline. Forehead dull olive greyish-brown, blending to dark rufous crown. Upperparts dull olive-brown. Throat whitish with irregular black flecking in centre.

Family Pipridae

***Chiroxiphia caudata* (Shaw & Nodder, 1793)**, Swallow-tailed Manakin

Observations. BRAZIL – Minas Gerais • Volta Grande; 21°46′59″S, 042°29′42″W; 08.I.2017; obs.; 1 sex indet.

Identification. Both sexes with elongated central rectrices. Male has black head with red band from forehead to nape; body and much of tail bright turquoise-blue, wings and outer tail black, undertail coverts dusky; iris dark brown; bill pinkish to sooty; legs pinkish to sooty. Female is dull green.

***Manacus manacus* (Linnaeus, 1766)**, White-bearded Manakin

Observations. BRAZIL – Minas Gerais • Volta Grande; 21°46′59″S, 042°29′42″W; 08.I.2017; obs.; 1 ♀.

Identification. Male has upperparts mostly black, except for the broad nape collar and a grey rump, underparts are almost entirely white, with a grey wash, variable in intensity, on the belly and flanks. Females are totally dull olive.

Family Tityridae

***Pachyramphus polychopterus* (Vieillot, 1818)**, White-winged Becard

Observations. BRAZIL – Minas Gerais • Volta Grande; 21°46′59″S, 042°29′42″W; 08.I.2017; obs.; 1 sex indet.

Identification. Male mostly shiny black, lower underparts greyer, white wing bars, prominent pale edges on remiges. Female has brownish-olive or greenish-olive upperparts, pale whitish supraloral stripe, wings with broad buff-cinnamon margins on scapulars, wing-coverts and inner remiges, blackish tail with broad buff-cinnamon tips; pale yellowish below, olive tinge on breast and sides, more greyish throat.

Family Platyrinchidae

***Platyrinchus mystaceus* Vieillot, 1818**, White-throated Spadebill

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°44′23″S, 042°28′52″W; 21°41′30″S, 042°28′47″W; 21°46′59″S, 042°29′42″W; 30.III.2013; obs.; 1 sex indet.

Identification. Adult male has dark olive crown with large, partially concealed yellow patch, upperparts brownish olive to reddish brown. Pale yellow on lower breast and belly. Adult female like male but lacks crown patch or is only very slightly indicated.

Family Rhynchocyclidae

***Tolmomyias sulphurescens* (Spix, 1825)**, Yellow-olive Flycatcher

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°43′55″S, 042°29′27″W; 21°42′15″S, 042°30′27″W; 21°41′02″S, 042°27′17″W; 21°44′23″S, 042°28′52″W; 21°41′30″S, 042°28′47″W; 21°45′21″S, 042°27′01″W; 21°46′10″S, 042°26′35″W; 21°46′07″S, 042°27′11″W; 21°46′59″S, 042°29′42″W; first record on 07.I.2017; obs.; multiple (no sexual dimorphism).

Identification. Dark olive crown, narrow whitish supraloral and eyering, pale olive auriculars with dusky patch towards rear.

***Todirostrum poliocephalum* (Wied, 1831)**, Gray-headed Tody-Flycatcher
Figure 6D

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°43′55″S, 042°29′27″W; 21°42′15″S, 042°30′27″W; 21°43′11″S, 042°28′02″W; 21°46′59″S, 042°29′42″W; first record on 24.XII.2015; obs.; 9 (no sexual dimorphism).

Identification. Ash-grey crown, prominent bright yellow lores, yellow-orange iris, bright lemon-yellow underparts, siskin-green or olive upperparts, blackish-brown tail with olive edges.

***Todirostrum cinereum* (Linnaeus, 1766)**, Common Tody-Flycatcher
Figure 6E

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°44′23″S, 042°28′52″W; 21°41′30″S, 042°28′47″W; 21°45′21″S, 042°27′01″W; 21°44′33″S, 042°27′41″W; 21°44′6″S, 042°33′14″W; first record on 17.VIII.2013; obs.; multiple sex indet.

Identification. This species is distinguished from *T. poliocephalum* by having lores and ocular region black, tail rounded, black, with outer feathers with white tips. Iris yellowish to white. The female differs by having a greyer head and an entirely fleshy and white lower mandible.

Family Tyrannidae

***Camptostoma obsoletum* (Temminck, 1824)**, Southern Beardless-Tyrannulet

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°44′23″S, 042°28′52″W; 21°41′30″S, 042°28′47″W; 21°45′21″S, 042°27′01″W; 21°44′01″S, 042°27′09″W; 21°43′11″S, 042°28′02″W; 21°46′52″S, 042°28′12″W; 21°44′6″S, 042°33′14″W; first record on 17.VIII.2013; obs.; multiple (no sexual dimorphism).

Identification. Medium olive-grey above, slightly greyer on crown, crown feathers often elongated with dark centres. Lores and thin broken eyering whitish.

***Elaenia flavogaster* (Thunberg, 1822)**, Yellow-bellied Elaenia

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°44′23″S, 042°28′52″W; 21°41′30″S, 042°28′47″W; 21°43′11″S, 042°28′02″W; 21°46′07″S, 042°27′11″W; 21°46′52″S, 042°28′12″W; 21°44′6″S, 042°33′14″W; first record on 07.I.2017; obs.; multiple (no sexual dimorphism).

Identification. Upperparts brownish-olive. Throat pale grey, breast olive-grey, belly yellow to pale yellow or even whitish.

***Capsiempis flaveola* (Lichtenstein, 1823)**, Yellow Tyrannulet
Figure 6F

Observations. BRAZIL – Minas Gerais • Estrela Dalva; 21°44′23″S, 042°28′52″W; 18.XII.2019; obs.; 2 (no sexual dimorphism).

Identification. Prominent bright yellow supercilium, bright yellow broken eyering. Upperparts dark yellowish-olive and underparts bright saturated yellow. Crown slightly darker with feathers somewhat elongated to form bushy crest.

***Phyllomyias fasciatus* (Thunberg, 1822)**, Planalto Tyrannulet

Observations. BRAZIL – Minas Gerais • Volta Grande; 21°46′52″S, 042°28′12″W; first record on 08.I.2017; obs.; 3 (no sexual dimorphism).

Identification. The subspecies *Phyllomyias fasciatus brevirostris* occurs in the region. Compared to the nominate subspecies it is somewhat larger and darker olive above, wing bars and edges of remiges pale olive, throat less extensively white, underparts darker yellow.

***Attila rufus* (Vieillot, 1819)**, Gray-hooded Attila

Observations. BRAZIL – Minas Gerais • Volta Grande; 21°46′59″S, 042°29′42″W; 08.I.2017; obs.; 2 (no sexual dimorphism).

Identification. Grey head and nape contrasting with deep rufous back, paler cinnamon-rufous rump and tail, dark eyes, rather long bill with whitish to greyish lower mandible, grey legs.

***Myiarchus swainsoni* Cabanis & Heine, 1859**, Swainson's Flycatcher

Observations. BRAZIL – Minas Gerais • Estrela Dalva; 21°44′23″S, 042°28′52″W; 15.VII.2018; obs.; 1 (no sexual dimorphism).

Identification. Crown and upperparts a nondescript dull olive grey-green with no marked contrast, except tending to slightly browner colour on upper tail-coverts and primaries. Underparts yellow with somewhat grey tinge.

***Myiarchus ferox* (Gmelin, 1789)**, Short-crested Flycatcher

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°44′23″S, 042°28′52″W; 21°41′30″S, 042°28′47″W; 21°46′07″S, 042°27′11″W; 21°46′52″S, 042°28′12″W; 21°44′6″S, 042°33′14″W; first record on 17.VIII.2013; obs.; multiple (no sexual dimorphism).

Identification. Upperparts typically smoky brown, little or no contrast between crown and upperparts. Underparts yellow with a somewhat grey tinge. Iris, bill, and legs dark.

***Pitangus sulphuratus* (Linnaeus, 1766)**, Great Kiskadee
Figure 7A

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°43′55″S, 042°29′27″W; 21°42′15″S, 042°30′27″W; 21°41′02″S, 042°27′17″W; 21°44′23″S, 042°28′52″W; 21°41′30″S, 042°28′47″W; 21°45′21″S, 042°27′01″W; 21°46′10″S, 042°26′35″W; 21°44′01″S, 042°27′09″W; 21°43′11″S, 042°28′02″W; 21°46′07″S, 042°27′11″W; 21°44′33″S, 042°27′41″W; 21°46′59″S, 042°29′42″W; 21°46′52″S, 042°28′12″W; 21°44′6″S, 042°33′14″W; first record on 30.III.2013; obs.; multiple (no sexual dimorphism).

Identification. Head broadly striped black and white, with black crown and mask contrasting with white supercilium. Upperparts brownish olive and underparts bright yellow.

***Machetornis rixosa* (Vieillot, 1819)**, Cattle Tyrant

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°44′23″S, 042°28′52″W; 21°41′30″S, 042°28′47″W; 21°45′21″S, 042°27′01″W; 21°44′01″S, 042°27′09″W; 21°44′6″S, 042°33′14″W; first record on 30.III.2013; obs.; multiple (no sexual dimorphism).

Identification. Upperparts usually pale olive-brown, underparts mostly bright yellow. Head mostly pale brownish, more greyish on crown. Bright scarlet-orange coronal patch. Legs long and iris light red.

***Myiodynastes maculatus* (Statius Müller, 1776)**, Streaked Flycatcher
Figure 7B

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°44′23″S, 042°28′52″W; 21°41′30″S, 042°28′47″W; 21°43′11″S, 042°28′02″W; 21°44′33″S, 042°27′41″W; 21°46′59″S, 042°29′42″W; 21°46′52″S, 042°28′12″W; first record on 05.I.2017; obs.; 6 (no sexual dimorphism).

Identification. Upperparts with dusky streaks, pale yellowish white underparts with dark streaking on the breast, flanks, and crissum. Mask black, tail rufous, and supercilium whitish.

***Megarynchus pitangua* (Linnaeus, 1766)**, Boat-billed Flycatcher

Observations. BRAZIL – Minas Gerais • Estrela Dalva; 21°44′23″S, 042°28′52″W; 21°41′30″S, 042°28′47″W; 21°45′21″S, 042°27′01″W; 21°46′10″S, 042°26′35″W; 21°44′01″S, 042°27′09″W; 21°43′11″S, 042°28′02″W; 21°46′07″S, 042°27′11″W; 21°44′33″S, 042°27′41″W; 21°44′6″S, 042°33′14″W; first record on 30.III.2013; obs.; multiple (no sexual dimorphism).

Identification. Distinguished from *Pitangus sulphuratus* by voice and bill size.

***Myiozetetes cayanensis* (Linnaeus, 1766)**, Rusty-margined Flycatcher

Observations. BRAZIL – Minas Gerais • Estrela Dalva; 21°45′37″S, 042°27′15″W; 21°44′28″S, 042°28′36″W; 21°44′23″S, 042°28′52″W; 21°45′21″S, 042°27′01″W; 21°44′10″S, 042°33′22″W; first record on 07.I.2017; obs.; 10 (no sexual dimorphism).

Identification. Differs from *M. similis* in having a less dusky head, a less olivaceous back and a large bright yellow (mostly concealed) coronal patch.

***Myiozetetes similis* (Spix, 1825)**, Social Flycatcher

Observations. BRAZIL – Minas Gerais • Estrela Dalva; e Volta Grande; 21°43′55″S, 042°29′27″W; 21°42′15″S, 042°30′27″W; 21°44′23″S, 042°28′52″W; 21°41′30″S, 042°28′47″W; 21°45′21″S, 042°27′01″W; 21°46′10″S, 042°26′35″W; 21°44′33″S, 042°27′41″W; 21°44′6″S, 042°33′14″W; first record on 15.VII.2018; obs.; multiple (no sexual dimorphism).

Identification. Large bright red to orangish-red (mostly concealed) coronal patch, broad white supercilia confluent on forehead and nearly connecting on nape. Upperparts dull olive-green or brownish-olive, underparts bright yellow.

***Tyrannus melancholicus* Vieillot, 1819**, Tropical Kingbird

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°44′23″S, 042°28′52″W; 21°41′30″S, 042°28′47″W; 21°45′21″S, 042°27′01″W; 21°44′01″S, 042°27′09″W; 21°44′33″S, 042°27′41″W; 21°46′52″S, 042°28′12″W; 21°44′6″S, 042°33′14″W; first record on 30.III.2013; obs.; multiple (no sexual dimorphism).

Identification. Top and head grey, crown concealed, orange. Underparts yellow.

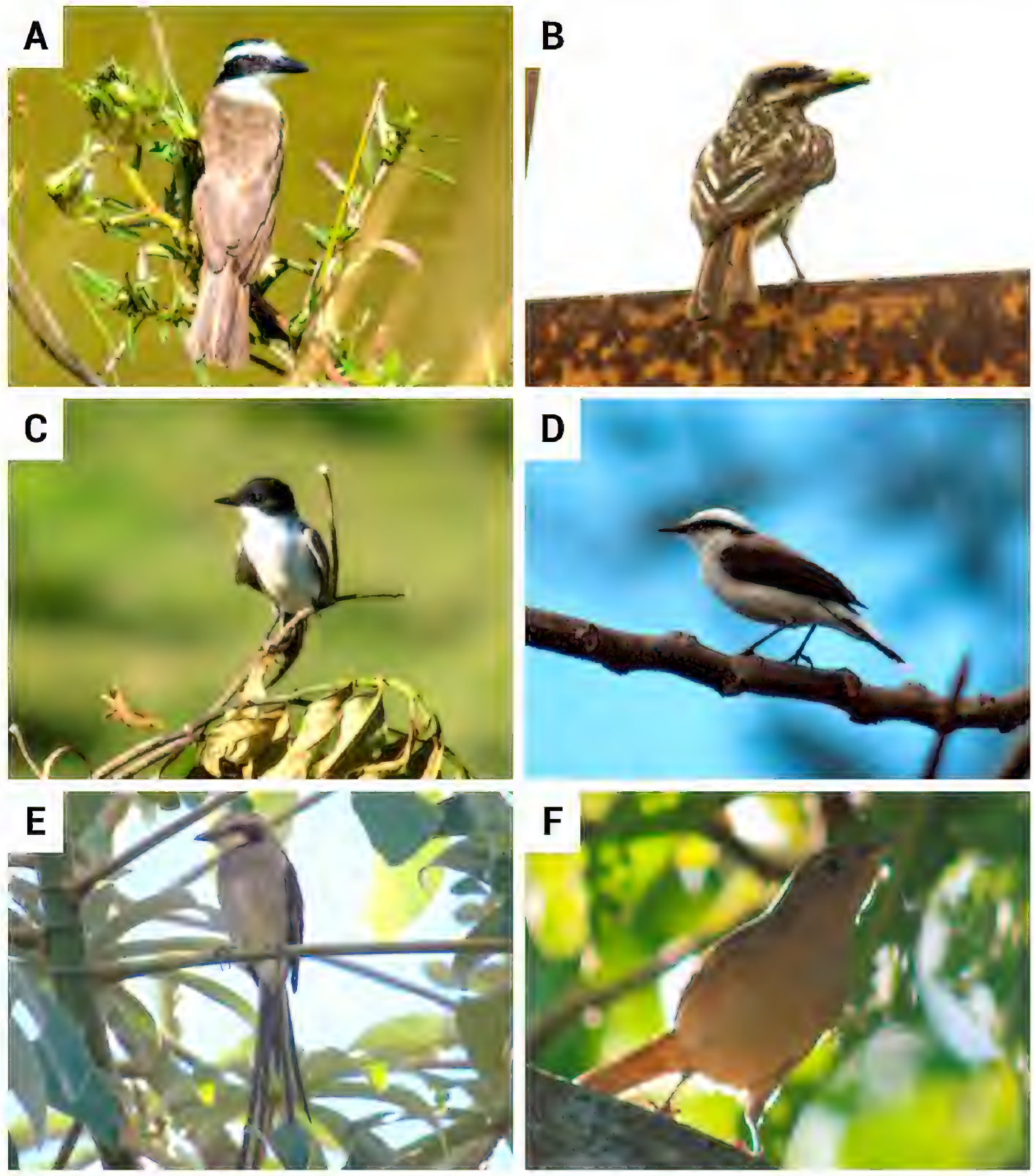

Figure 7. Bird species recorded in the study area. **A.** *Pitangus sulphuratus*. **B.** *Myiodynastes maculatus*. **C.** *Tyrannus savana*. **D.** *Fluvicola nengeta*. **E.** *Gubernetes yetapa*. **F.** *Troglodytes musculus*.

***Tyrannus savana* Daudin, 1802**, Southern Fork-tailed Flycatcher
Figure 7C

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°44′23″S, 042°28′52″W; 21°41′30″S, 042°28′47″W; 21°46′10″S, 042°26′35″W; 21°44′01″S, 042°27′09″W; 21°43′11″S, 042°28′02″W; 21°46′52″S, 042°28′12″W; 21°44′6″S, 042°33′14″W; first record on 16.II.2015; obs.; multiple sex indet.

Identification. Black on head, wings, and tail, with back grey. Distinctively long, black, bifurcated tail that is often longer than the body. Sexes similar except for length of tail, longer in males.

***Empidonomus varius* (Vieillot, 1818)**, Variegated Flycatcher

Observations. BRAZIL – Minas Gerais • Estrela Dalva; 21°44′23″S, 042°28′52″W; 21°44′33″S, 042°27′41″W; first record on 23.XII.2014; obs.; 2 (no sexual dimorphism).

Identification. Similar to *Myiodynastes maculatus*, but smaller and thinner.

***Colonia colonus* (Vieillot, 1818)**, Long-tailed Tyrant

Observations. BRAZIL – Minas Gerais • Estrela Dalva; 21°41′02″S, 042°27′17″W; 26.XII.2014; obs.; 1 ♂ and 1 ♀.

Identification. Male predominately black, with white forehead and forecrown; whitish rump; central tail feathers elongated. Female similar, but paler and greyer, belly mottled white, crown darker, shorter tail streamers.

***Arundinicola leucocephala* (Linnaeus, 1764)**, White-headed Marsh Tyrant

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°41′30″S, 042°28′47″W; 21°44′10″S, 042°33′22″W; first record on 26.XII.2018; obs.; 2 ♂.

Identification. Male has white head and throat contrasting sharply with rest of black plumage. Female has white forecrown, greyish-brown upperparts, darker wings and tail, whitish below, whitest on throat, mottled ashy brown across breast, sides, and flanks.

***Fluvicola nengeta* (Linnaeus, 1766)**, Masked Water-Tyrant
Figure 7D

Observations. BRAZIL – Minas Gerais • Estrela Dalva; 21°44′23″S, 042°28′52″W; 21°41′30″S, 042°28′47″W; 21°45′21″S, 042°27′01″W; 21°44′01″S, 042°27′09″W; 21°44′33″S, 042°27′41″W; 21°44′10″S, 042°33′22″W; first record on 30.III.2013; obs.; multiple (no sexual dimorphism).

Identification. Plumage mostly white, with contrasting black wings and white-tipped black tail. Back tinged brownish-grey. Iris dark, bill and legs black.

***Gubernetes yetapa* (Vieillot, 1818)**, Streamer-tailed Tyrant
Figure 7E

Observations. BRAZIL – Minas Gerais • Estrela Dalva; 21°41′30″S, 042°28′47″W; 21°45′21″S, 042°27′01″W; first record on 17.VIII.2013; obs.; multiple (♂ and ♀).

Identification. Male has pale grey forecrown and supercilium. Upperparts mostly pale grey with dark brown shaft streaks. Wings blackish. Tail long, graduated, and very deeply forked, blackish. Female is smaller, shorter-tailed and slightly duller.

***Myiophobus fasciatus* (Statius Müller, 1776)**, Bran-colored Flycatcher

Observations. BRAZIL – Minas Gerais • Estrela Dalva; 21°44′23″S, 042°28′52″W; 26.XII.2014; obs.; 1 sex indet.

Identification. Upperparts dull greyish-brown, underparts streaked, greyish brown on breast and sides. Semi-concealed orange-rufous patch. Female lacks coronal patch (or much reduced).

***Lathrotriccus euleri* (Cabanis, 1868)**, Euler's Flycatcher

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°43′55″S, 042°29′27″W; 21°46′59″S, 042°29′42″W; 17.VIII.2013; obs.; 1 (no sexual dimorphism).

Identification. Warm olive-brown crown, whitish eye ring and indistinct supraloral stripe. Wings dusky with two pale buff wing bars. Tail dusky. Throat greyish white, breast washed brownish-olive, belly pale yellow to white.

***Contopus cinereus* (Spix, 1825)**, Tropical Pewee

Observations. BRAZIL – Minas Gerais • Volta Grande; 21°46′59″S, 042°29′42″W; 08.I.2017; obs.; 1 (no sexual dimorphism).

Identification. Peaked crown with a slight crest, dark sooty-grey upperparts and two indistinct paler wing bars, grey throat, and a tiny area of white on the central belly and undertail coverts.

***Knipolegus lophotes* Boie, 1828**, Crested Black-Tyrant

Observations. BRAZIL – Minas Gerais • Volta Grande; 21°46′52″S, 042°28′12″W; 08.I.2017; obs.; 1 (no sexual dimorphism).

Identification. Plumage glossy blue-black, head with long, slender, pointed crest; base of remiges white; iris dark red or reddish-brown; bill and legs black.

***Xolmis velatus* (Lichtenstein, 1823)**, White-rumped Monjita

Observations. BRAZIL – Minas Gerais • Estrela Dalva; 21°41′30″S, 042°28′47″W; 17.VIII.2013; obs.; 1 (no sexual dimorphism).

Identification. Head mostly white, hindneck pearly grey. Back brownish-grey, contrasting white rump and basal half of tail, terminal half of tail black. Wings blackish; all white below. Iris dark and bill black.

Family Vireonidae

***Cyclarhis gujanensis* (Gmelin, 1789)**, Rufous-browed Peppershrike

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°43′55″S, 042°29′27″W; 21°42′15″S, 042°30′27″W; 21°41′02″S, 042°27′17″W; 21°44′23″S, 042°28′52″W; 21°41′30″S, 042°28′47″W; 21°46′10″S, 042°26′35″W; 21°44′01″S, 042°27′09″W; 21°46′07″S, 042°27′11″W; 21°46′59″S, 042°29′42″W;

21°46′52″S, 042°28′12″W; 21°44′6″S, 042°33′14″W; first record on 17.VIII.2013; obs.; multiple (no sexual dimorphism).

Identification. Head grey, with a rufous eyebrow. Upperparts bright olive-green. Throat and chest yellowish.

***Hylophilus amaurocephalus* (Nordmann, 1835)**, Gray-eyed Greenlet

Observations. BRAZIL – Minas Gerais • Volta Grande; 21°46′59″S, 042°29′42″W; 08.I.2017; obs.; 1 (no sexual dimorphism).

Identification. Forehead and crown chestnut-brown, ear-coverts and area around and below eye mottled grey-white; distinct pale greyish superciliary line; nape and upper back dull grey-brown, becoming tinged with green on lower back, shoulders and rump; throat dull greyish, becoming dull brownish-grey on chest, belly and vent, yellowish on flanks.

***Hylophilus thoracicus* Temminck, 1822**, Lemon-chested Greenlet

Observations. BRAZIL – Minas Gerais • Estrela Dalva; 21°41′02″S, 042°27′17″W; 21°46′59″S, 042°29′42″W; first record on 26.XII.2018; obs.; 2 (no sexual dimorphism).

Identification. Upperparts bright olive-green, breastband greenish-yellow. Rear crown, nape, throat, and posterior underparts grey.

***Vireo chivi* (Vieillot, 1817)**, Chivi Vireo

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°43′55″S, 042°29′27″W; 21°42′15″S, 042°30′27″W; 21°46′59″S, 042°29′42″W; first record on 23.XII.2014; obs.; 2 (no sexual dimorphism).

Identification. Crown grey, supercilium white. Upperparts and tail olive-green; underparts whitish.

Family Corvidae

***Cyanocorax cristatellus* (Temminck, 1823)**, Curl-crested Jay

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°44′23″S, 042°28′52″W; 21°41′30″S, 042°28′47″W; 21°45′21″S, 042°27′01″W; 21°46′10″S, 042°26′35″W; 21°44′01″S, 042°27′09″W; 21°43′11″S, 042°28′02″W; 21°46′07″S, 042°27′11″W; 21°46′52″S, 042°28′12″W; 21°44′6″S, 042°33′14″W; first record on 23.XII.2014; obs.; multiple (no sexual dimorphism).

Identification. Distinctive curled crest always visible. Head, neck, and chest sooty black. Upperparts violet-blue, underparts white.

Family Hirundinidae

***Pygochelidon cyanoleuca* (Vieillot, 1817)**, Blue-and-white Swallow

Observations. BRAZIL – Minas Gerais • Estrela Dalva; 21°44′23″S, 042°28′52″W; 21°41′30″S, 042°28′47″W; 21°45′21″S, 042°27′01″W; 21°46′10″S, 042°26′35″W; 21°44′01″S, 042°27′09″W; 21°43′11″S, 042°28′02″W; 21°46′07″S, 042°27′11″W; 21°44′33″S, 042°27′41″W; first record on 30.III.2013; obs.; multiple (no sexual dimorphism).

Identification. Upperparts glossy steel-blue to violet-blue, underparts white. Tail short and slightly forked.

***Stelgidopteryx ruficollis* (Vieillot, 1817)**, Southern Rough-winged Swallow

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°44′23″S, 042°28′52″W; 21°41′30″S, 042°28′47″W; 21°45′21″S, 042°27′01″W; 21°44′01″S, 042°27′09″W; 21°43′11″S, 042°28′02″W; 21°46′07″S, 042°27′11″W; 21°46′52″S, 042°28′12″W; 21°44′6″S, 042°33′14″W; first record on 30.III.2013; obs.; multiple (no sexual dimorphism).

Identification. Dark grey-brown, slightly darker on crown. Throat cinnamon; abdomen yellowish.

***Progne tapera* (Linnaeus, 1766)**, Brown-chested Martin

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°44′23″S, 042°28′52″W; 21°41′30″S, 042°28′47″W; 21°45′21″S, 042°27′01″W; 21°44′01″S, 042°27′09″W; 21°46′52″S, 042°28′12″W; first record on 17.VIII.2013; obs.; multiple (no sexual dimorphism).

Identification. Crown and upperparts sandy brown. Wings and tail darker brown. Tail slightly forked.

***Progne chalybea* (Gmelin, 1789)**, Gray-breasted Martin

Observations. BRAZIL – Minas Gerais • Estrela Dalva; 21°44′23″S, 042°28′52″W; 21°41′30″S, 042°28′47″W; 21°45′21″S, 042°27′01″W; 21°46′10″S, 042°26′35″W; 21°44′01″S, 042°27′09″W; 21°43′11.″S, 042°28′02″W; 21°46′07″S, 042°27′11″W; 21°44′33″S, 042°27′41″W; first record on 17.VIII.2013; obs.; multiple (no sexual dimorphism).

Identification. Similar to *P. tapera*, but has a shiny, blue back.

Family Troglodytidae

***Troglodytes musculus* Naumann, 1823**, Southern House Wren
Figure 7F

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°44′23″S, 042°28′52″W; 21°41′30″S, 042°28′47″W; 21°45′21″S, 042°27′01″W; 21°46′10″S, 042°26′35″W; 21°44′01″S, 042°27′09″W; 21°43′11″S, 042°28′02″W; 21°46′07″S, 042°27′11″W; 21°44′33″S, 042°27′41″W; 21°44′6″S, 042°33′14″W; first record on 30.III.2013; obs.; multiple (no sexual dimorphism).

Identification. Predominantly brown with some black, dark brown, and buffy barring on flanks, tail, and wings.

Family Donacobiidae

***Donacobius atricapilla* (Linnaeus, 1766)**, Black-capped Donacobius
Figure 8A

Observations. BRAZIL – Minas Gerais • Estrela Dalva; 21°44′23″S, 042°28′52″W; 21°46′10″S, 042°26′35″W; first record on 25.XII.2016; obs.; 3 (no sexual dimorphism).

Identification. Upperparts dark brown, underparts yellowish. Each side of throat yellowish; iris yellow; head, bill, and tail black.

Family Turdidae

***Turdus leucomelas* Vieillot, 1818**, Pale-breasted Thrush

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°43′55″S, 042°29′27″W; 21°42′15″S, 042°30′27″W; 21°41′02″S, 042°27′17″W; 21°44′23″S, 042°28′52″W; 21°41′30″S, 042°28′47″W; 21°45′21″S, 042°27′01″W; 21°46′10″S, 042°26′35″W; 21°44′01″S, 042°27′09″W; 21°43′11″S, 042°28′02″W; 21°46′07″S, 042°27′11″W; 21°44′33″S, 042°27′41″W; 21°46′59″S, 042°29′42″W; 21°46′52″S, 042°28′12″W; first record on 24.XII.2013; obs.; multiple (no sexual dimorphism).

Identification. Upperparts pale olive-brown, underparts whitish. Throat whitish with diffuse, narrow mid-brown streaks. Pale orange underwing-coverts.

***Turdus rufiventris* Vieillot, 1818**, Rufous-bellied Thrush

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°43′55″S, 042°29′27″W; 21°42′15″S, 042°30′27″W; 21°41′02″S, 042°27′17″W; 21°44′33″S, 042°27′41″W; 21°46′59″S, 042°29′42″W; first record on 17.VIII.2013; obs.; multiple (no sexual dimorphism).

Identification. Distinctive rufous underpart.

***Turdus amaurochalinus* Cabanis, 1850**, Creamy-bellied Thrush

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°43′55″S, 042°29′27″W; 21°42′15″S, 042°30′27″W; 21°41′02″S, 042°27′17″W; 21°44′33″S, 042°27′41″W; 21°46′59″S, 042°29′42″W; first record on 24.XII.2013; obs.; multiple (no sexual dimorphism).

Identification. Upperparts olive-brown, underparts whitish with streaked throat. Bill yellow when breeding, otherwise duller.

Family Mimidae

***Mimus saturninus* (Lichtenstein, 1823)**, Chalk-browed Mockingbird

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°44′23″S, 042°28′52″W; 21°41′30″S, 042°28′47″W; 21°45′21″S, 042°27′01″W; 21°46′07″S, 042°27′11″W; 21°46′52″S, 042°28′12″W; 21°44′6″S, 042°33′14″W; first record on 17.VIII.2013; obs.; multiple (no sexual dimorphism).

Identification. Brownish, with long legs, long graduated tail held semi-erect. Iris yellow, bill black.

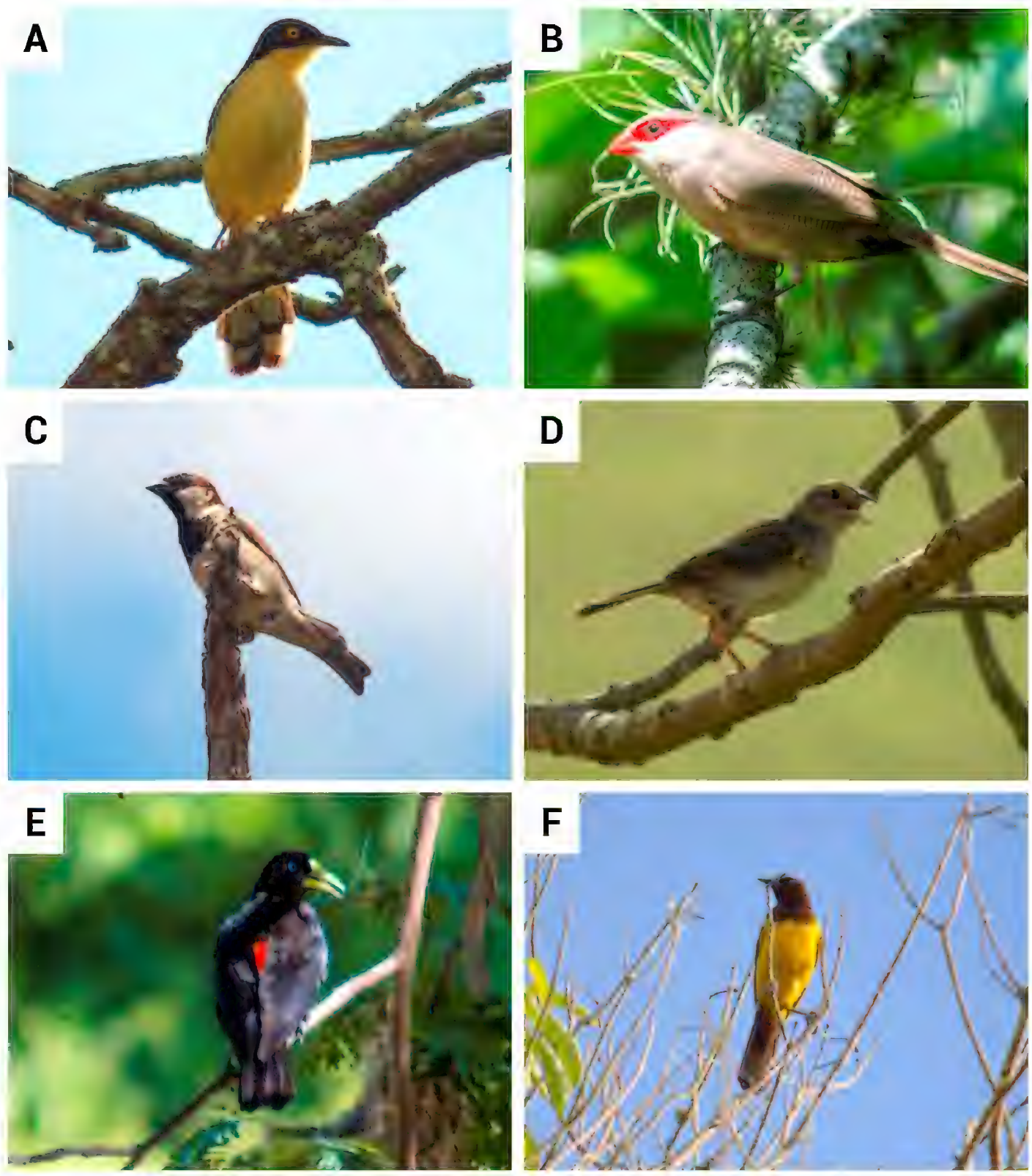

Figure 8. Bird species recorded in the study area. **A.** *Donacobius atricapilla*. **B.** *Estrilda astrild**. **C.** *Passer domesticus**. **D.** *Ammodramus humeralis*. **E.** *Cacicus haemorrhous*. **F.** *Pseudoleistes guirahuro*. (*) Introduced exotic species.

Family Estrildidae

***Estrilda astrild* (Linnaeus, 1758)**, Common Waxbill
Figure 8B

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°44′23″S, 042°28′52″W; 21°41′30″S, 042°28′47″W; 21°45′21″S, 042°27′01″W; 21°44′01″S, 042°27′09″W; 21°43′11″S, 042°28′02″W; 21°46′7.44″S, 042°27′11″W; 21°44′33″S, 042°27′41″W; 21°44′6″S, 042°33′14″W; first record on 30.III.2013; obs.; multiple (no sexual dimorphism).

Identification. Red stripe from lores to above ear-coverts. Head and upperparts pale greyish brown. Centre of belly bright pink. Bill red, legs black.

Family Passeridae

***Passer domesticus* (Linnaeus, 1758)**, House Sparrow
Figure 8C

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°44′01″S, 042°27′09″W; 21°44′33″S, 042°27′41″W; 21°44′6″S, 042°33′14″W; first record on 30.III.2013; obs.; multiple (♂ and ♀).

Identification. Male has upperparts brown with black streaking and underparts grey. Chin and throat black; crown and nape chestnut. Female with unmarked throat and breast; upperparts similar in pattern to male, but duller, lacking chestnut tones.

Family Motacillidae

***Anthus chii* Vieillot, 1818**, Yellowish Pipit

Observations. BRAZIL – Minas Gerais • Estrela Dalva; 21°44′23″S, 042°28′52″W; 21°45′21″S, 042°27′01″W; first record on 27.XII.2013; obs.; 2 (no sexual dimorphism).

Identification. Upperparts brown streaked with black, underparts yellowish. Breast streaked, iris dark brown. Distinguished from almost all other pipits by small size and yellowish underparts.

Family Fringillidae

***Euphonia chlorotica* (Linnaeus, 1766)**, Purple-throated Euphonia

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°43′55″S, 042°29′27″W; 21°42′15″S, 042°30′27″W; 21°41′02″S, 042°27′17″W; 21°44′23″S, 042°28′52″W; 21°41′30″S, 042°28′47″W; 21°45′21″S, 042°27′01″W; 21°46′10″S, 042°26′35″W; 21°43′11″S, 042°28′02″W; 21°44′33″S, 042°27′41″W; 21°46′59″S, 042°29′42″W; 21°46′52″S, 042°28′12″W; 21°44′6″S, 042°33′14″W; first record on 17.VIII.2013; obs.; multiple (♂ and ♀).

Identification. Male has bright yellow forehead and forecrown extending to just above rear of eye. Upperpart glossy blue-black, underparts bright yellow. Female is olive with faint greyish tinge above; central belly pale ash-grey.

Family Passerellidae

***Ammodramus humeralis* (Bosc, 1792)**, Grassland Sparrow
Figure 8D

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°44′23″S, 042°28′52″W; 21°41′30″S, 042°28′47″W; 21°45′21″S, 042°27′01″W; 21°46′10″S, 042°26′35″W; 21°44′01″S, 042°27′09″W; 21°43′11″S, 042°28′02″W; 21°46′7″S, 042°27′11″W; 21°46′52″S, 042°28′12″W; 21°44′6″S, 042°33′14″W; first record on 27.XII.2013; obs.; multiple (no sexual dimorphism).

Identification. Yellow patch in supraloral area. Shoulders bright yellow. Upperparts brownish, underparts greyish.

***Zonotrichia capensis* (Statius Müller, 1776)**, Rufous-collared Sparrow

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°44′23″S, 042°28′52″W; 21°41′30″S, 042°28′47″W; 21°45′21″S, 042°27′01″W; 21°43′11″S, 042°28′02″W; 21°44′6″S, 042°33′14″W; first record on 23.XII.2014; obs.; multiple (no sexual dimorphism).

Identification. Head, semi-crest, and cheek grey. Lateral crown-stripe black. Nape and side of neck rufous.

Family Icteridae

***Leistes superciliaris* (Bonaparte, 1850)**, White-browed Meadowlark

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°44′23″S, 042°28′52″W; 21°45′21″S, 042°27′01″W; 21°46′52″S, 042°28′12″W; first record on 07.I.2017; obs.; 3 ♂.

Identification. Male has upperparts mostly black; superciliary line behind eye white; breast red. Female has upperparts streaked blackish and buff; supercilium pale buff; underparts tinged with pink.

***Psarocolius decumanus* (Pallas, 1769)**, Crested Oropendola

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°43′55″S, 042°29′27″W; 21°42′15″S, 042°30′27″W; 21°41′02″S, 042°27′17″W; 21°44′23″S, 042°28′52″W; 21°41′30″S, 042°28′47″W; 21°45′21″S, 042°27′01″W; 21°46′10″S, 042°26′35″W; 21°44′01″S, 042°27′09″W; 21°43′11″S, 042°28′02″W; 21°46′7″S, 042°27′11″W; 21°44′33″S, 042°27′41″W; 21°46′59″S, 042°29′42″W; 21°44′6″S, 042°33′14″W; first record on 30.III.2013; obs.; multiple (no sexual dimorphism).

Identification. Predominantly black. Tail conspicuous, yellow. Bill large, ivory.

***Cacicus haemorrhous* (Linnaeus, 1766)**, Red-rumped Cacique
Figure 8E

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°44′23″S, 042°28′52″W; 21°41′30″S, 042°28′47″W; 21°44′6″S, 042°33′14″W; first record on 17.VIII.2013; obs.; multiple (no sexual dimorphism).

Identification. Predominantly black. Lower back and rump bright red. Iris light blue and bill large, ivory.

***Molothrus bonariensis* (Gmelin, 1789)**, Shiny Cowbird

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°44′23″S, 042°28′52″W; 21°41′30″S, 042°28′47″W; 21°45′21″S, 042°27′01″W; 21°46′10″S, 042°26′35″W; 21°44′01″S, 042°27′09″W; 21°43′11″S, 042°28′02″W; 21°46′07″S, 042°27′11″W; 21°46′52″S, 042°28′12″W; 21°44′6″S, 042°33′14″W; first record on 17.VIII.2013; obs.; multiple (♂ and ♀).

Identification. Male entirely glossy violet blue-black. Female dull greyish brown above, much paler below.

***Gnorimopsar chopi* (Vieillot, 1819)**, Chopi Blackbird

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°44′23″S, 042°28′52″W; 21°41′30″S, 042°28′47″W; 21°45′21″S, 042°27′01″W; 21°46′10″S, 042°26′35″W; 21°44′01″S, 042°27′09″W; 21°43′11″S, 042°28′02″W; 21°46′07″S, 042°27′11″W; 21°44′6″S, 042°33′14″W; first record on 30.III.2013; obs.; multiple (no sexual dimorphism).

Identification. Entirely black. Distinctive curved bill, grooved on the lower mandible.

***Chrysomus ruficapillus* (Vieillot, 1819)**, Chestnut-capped Blackbird

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°44′28″S, 042°28′36″W; 21°44′23″S, 042°28′52″W; 21°41′30″S, 042°28′47″W; 21°45′21″S, 042°27′01″W; 21°46′10″S, 042°26′35″W; 21°44′01″S, 042°27′09″W; 21°43′11″S, 042°28′02″W; 21°46′07″S, 042°27′11″W; 21°44′10″S, 042°33′22″W; 21°44′6″S, 042°33′14″W; first record on 30.III.2013; obs.; multiple (♂ and ♀).

Identification. Male has a rufous crown and bib. Female has upperparts olivaceous brown faintly streaked with dusky tones; underparts olivaceous buff.

***Pseudoleistes guirahuro* (Vieillot, 1819)**, Yellow-rumped Marshbird
Figure 8F

Observations. BRAZIL – Minas Gerais • Estrela Dalva; 21°41′30″S, 042°28′47″W; 21°43′11″S, 042°28′02″W; first record on 17.VIII.2013; obs.; multiple (no sexual dimorphism).

Identification. Head to upper breast blackish-brown, upperparts brown. Rump yellow, breast to lower belly rich yellow. Iris brown. Bill and legs blackish.

Family Parulidae

***Geothlypis aequinoctialis* (Gmelin, 1789)**, Masked Yellowthroat

Observations. BRAZIL – Minas Gerais • Estrela Dalva; 21°44′23″S, 042°28′52″W; 15.VII.2018; obs.; 1 ♂.

Identification. Male has upperparts greenish-olive. Mask black and forehead grey. Female without black mask.

***Setophaga pitiayumi* (Vieillot, 1817)**, Tropical Parula

Observations. BRAZIL – Minas Gerais • Estrela Dalva; 21°44′23″S, 042°28′52″W; 21°45′21″S, 042°27′01″W; 21°44′33″S, 042°27′41″W; first record on 24.XII.2015; obs.; 3 ♂.

Identification. Male has upperparts bluish and underparts yellow; short black mask; two white wing bands. Female duller than male and no black mask.

***Basileuterus culicivorus* (Deppe, 1830)**, Golden-crowned Warbler

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°43′55″S, 042°29′27″W; 21°42′15″S, 042°30′27″W; 21°41′02″S, 042°27′17″W; 21°46′59″S, 042°29′42″W; first record on 23.XII.2014; obs.; 7 (no sexual dimorphism).

Identification. Crown with two broad lateral black stripes. Supercilium white. Upperparts deep olive-grey, underparts yellow.

Family Cardinalidae

***Caryothraustes brasiliensis* Cabanis, 1851**, Brazilian Grosbeak
Figure 9A

Observations. BRAZIL – Minas Gerais • Volta Grande; 21°46′59″S, 042°29′42″W; 08.I.2017; obs.; multiple (no sexual dimorphism).

Identification. This species was recently separated (Tonetti et al. 2017) and was previously considered a subspecies of *Caryothraustes canadensis*. Top of head and entire upperparts, including rectrices and

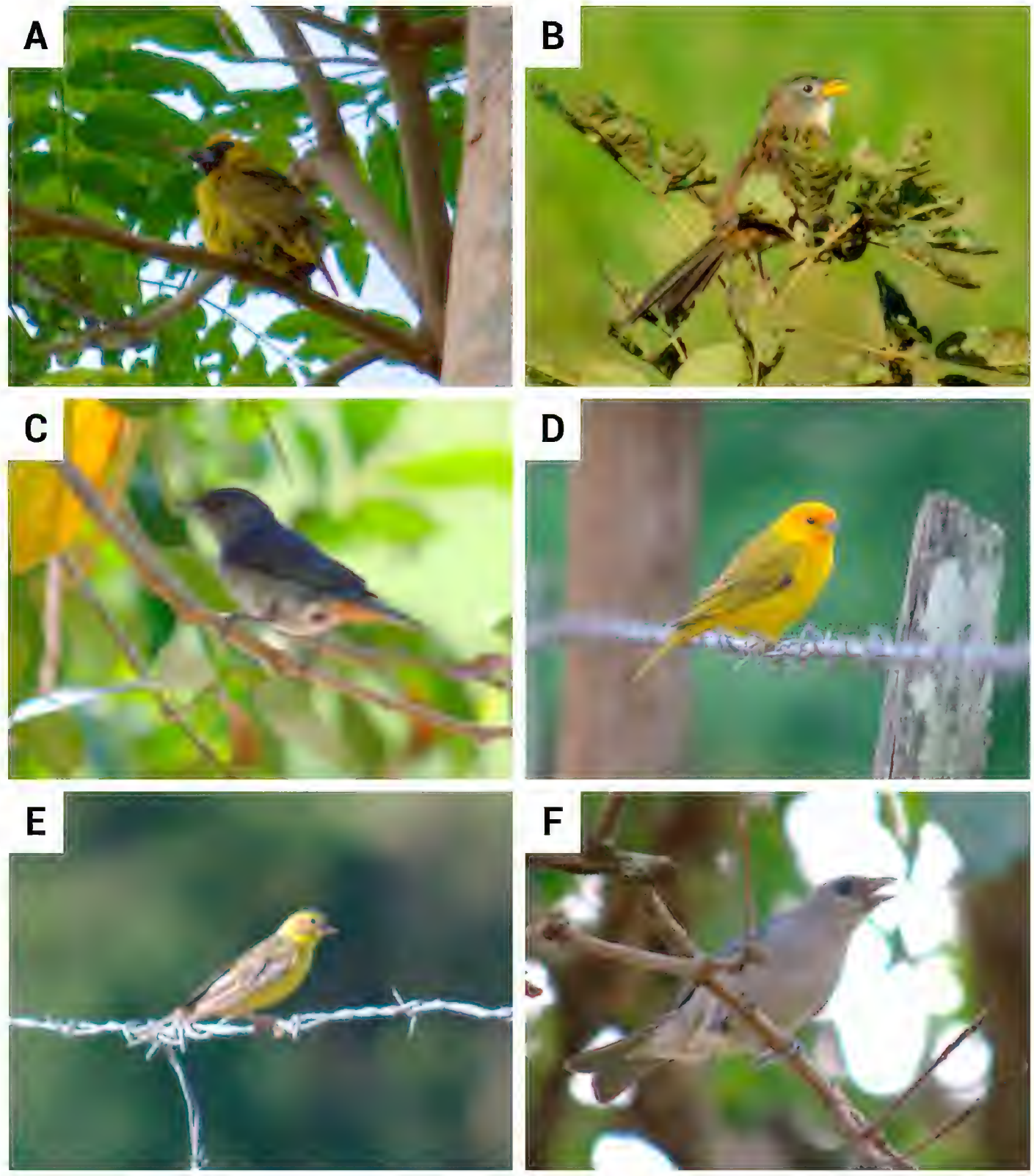

Figure 9. Bird species recorded in the study area. **A.** *Caryothraustes brasiliensis*. **B.** *Emberizoides herbicola*. **C.** *Conirostrum speciosum*. **D.** *Sicalis flaveola*. **E.** *Sicalis luteola*. **F.** *Thraupis sayaca*.

remiges, yellowish-green, remiges with yellow edgings on inner webs; lores down to cheek and throat black; underparts bright yellow, chest and flanks slightly greenish-tinged yellow; iris brown; bill black, base bluish-grey; legs grey.

Family Thraupidae

***Nemosia pileata* (Boddaert, 1783)**, Hooded Tanager

Observations. BRAZIL – Minas Gerais • Volta Grande; 21°46′59″S, 042°29′42″W; 08.I.2017; obs.; 1 ♂.

Identification. Both sexes light blue above, extensively white below, with pale eyes and tarsi. Male with a black crown.

***Emberizoides herbicola* (Vieillot, 1817)**, Wedge-tailed Grass-Finch
Figure 9B

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°44′23″S, 042°28′52″W; 21°41′30″S, 042°28′47″W; 21°45′21″S, 042°27′01″W; 21°43′11″S, 042°28′02″W; 21°46′52″S, 042°28′12″W; 21°44′6″S, 042°33′14″W ; first record on 03.VII.2016; obs.; multiple (no sexual dimorphism).

Identification. Upperparts greenish, streaked blackish, underparts creamy white. Bill yellow and tail long.

***Dacnis cayana* (Linnaeus, 1766)**, Blue Dacnis

Observations. BRAZIL – Minas Gerais • Estrela Dalva e Volta Gande; 21°44′33″S, 042°27′41″W; 21°46′59″S, 042°29′42″W; first record on 17.VIII.2013; obs.; 2 ♂ and 1 ♀.

Identification. Male predominately blue except around eye, central throat, tail, mantle, and back, black. Female mainly green with dull bluish head.

***Coereba flaveola* (Linnaeus, 1758)**, Bananaquit

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°44′33″S, 042°27′41″W; 21°46′59″S, 042°29′42″W; 21°44′6″S, 042°33′14″W; first record on 17.VIII.2013; obs.; multiple (no sexual dimorphism).

Identification. Upperparts dark grey to dusky olive, underparts bright yellow; supercilium white.

***Asemospiza fuliginosa* (Wied, 1830)**, Sooty Grassquit

Observations. BRAZIL – Minas Gerais • Estrela Dalva; 21°43′55″S, 042°29′27″W; 21°42′15″S, 042°30′27″W; first record on 23.XII.2014; obs.; 2 sex indet.

Identification. Male mainly sooty blackish. Iris dark and bill dark. Female brown, darker above than below.

***Volatinia jacarina* (Linnaeus, 1766)**, Blue-black Grassquit

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°44′23″S, 042°28′52″W; 21°41′30″S, 042°28′47″W; 21°45′21″S, 042°27′01″W; 21°46′10″S, 042°26′35″W; 21°44′01″S, 042°27′09″W; 21°43′11″S, 042°28′02″W; 21°46′07″S, 042°27′11″W; 21°46′52″S, 042°28′12″W; 21°44′6″S, 042°33′14″W; first record on 30.III.2013; obs.; multiple (♂ and ♀).

Identification. Males mostly black. Females brown with streaked breast.

***Coryphospingus pileatus* (Wied, 1821)**, Pileated Finch

Observations. BRAZIL – Minas Gerais • Estrela Dalva; 21°41′30″S, 042°28′47″W; 16.II.2015; obs.; 2 ♂ and 1 ♀.

Identification. Male has black crown and crest with bold red stripe down centre of crown; predominantly grey. Female dull greyish-brown above, off-white below with buff-grey flanks; lacks black and red on crown.

***Tachyphonus coronatus* (Vieillot, 1822)**, Ruby-crowned Tanager

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°42′15″S, 042°30′27″W; 21°41′02″S, 042°27′17″W; 21°46′59″S, 042°29′42″W; first record on 23.XII.2014; obs.; 5 ♂.

Identification. Male mainly glossy blue-black, with narrow (usually concealed) red patch in centre of rear crown. Female has greyish head and rest of body brown.

***Sporophila lineola* (Linnaeus, 1758)**, Lined Seedeater

Observations. BRAZIL – Minas Gerais • Estrela Dalva; 21°45′21″S, 042°27′01″W; 21°46′10″S, 042°26′35″W; first record on 13.IV.2019; obs.; 2 ♂.

Identification. Male has most of head and throat black, wide white stripe along mid-line of crown; upper-wing and tail black. Female dull and nondescript, brownish-olive above, paler below.

***Thlypopsis sordida* (d'Orbigny & Lafresnaye, 1837)**, Orange-headed Tanager

Observations. BRAZIL – Minas Gerais • Estrela Dalva; 21°44′23″S, 042°28′52″W; 21°43′11″S, 042°28′02″W; first record on 26.XII.2018; obs.; 2 (no sexual dimorphism).

Identification. Upperparts grey, underparts whitish. Head orange.

***Conirostrum speciosum* (Temminck, 1824)**, Chestnut-vented Conebill
Figure 9C

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°43′55″S, 042°29′27″W; 21°44′23″S, 042°28′52″W; 21°41′30″S, 042°28′47″W; 21°46′07″S, 042°27′11″W; 21°46′59″S, 042°29′42″W; first record on 07.I.2017; obs.; 5 ♂ and 4 ♀.

Identification. Male has head and upperparts rather dark greyish-blue; underparts slightly paler; under-tail-coverts chestnut. Female has bluish-grey crown and nape; upperparts olive-green; underparts dull greyish-white.

***Sicalis flaveola* (Linnaeus, 1766)**, Saffron Finch
Figure 9D

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°44′23″S, 042°28′52″W; 21°41′30″S, 042°28′47″W; 21°45′21″S, 042°27′01″W; 21°46′10″S, 042°26′35″W; 21°44′01″S, 042°27′09″W; 21°43′11″S, 042°28′02″W; 21°46′07″S, 042°27′11″W; 21°44′33″S, 042°27′41″W; 21°46′52″S, 042°28′12″W; 21°44′6″S, 042°33′14″W; first record on 30.III.2013; obs.; multiple (♂ and ♀).

Identification. Male has forehead orange and rest of body mostly yellow. Female similar but less vibrant in colour and with reduced orange on crown.

***Sicalis luteola* (Sparrman, 1789)**, Grassland Yellow-Finch
Figure 9E

Observations. BRAZIL – Minas Gerais • Estrela Dalva; 21°44′23″S, 042°28′52″W; 21°45′21″S, 042°27′01″W; first record on 18.XII.2019; obs.; 3 ♂.

Identification. Male has upperparts brownish, with dusky streaks and underparts mostly yellow and eyebrow yellow. Female similar but duller overall.

***Haplospiza unicolor* Cabanis, 1851**, Uniform Finch

Observations. BRAZIL – Minas Gerais • Estrela Dalva; 21°42′15″S, 042°30′27″W; 17.VIII.2013; obs.; 1 sex indet.

Identification. Male entire blue-grey, paler on belly and vent; iris dark brown and bill black. Female olive, obscurely streaked above.

***Thraupis sayaca* (Linnaeus, 1766)**, Sayaca Tanager
Figure 9F

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°44′23″S, 042°28′52″W; 21°41′30″S, 042°28′47″W; 21°45′21″S, 042°27′01″W; 21°46′10″S, 042°26′35″W; 21°44′01″S, 042°27′09″W; 21°43′11″S, 042°28′02″W; 21°46′07″S, 042°27′11″W; 21°44′33″S, 042°27′41″W; 21°46′59″S, 042°29′42″W; 21°46′52″S, 042°28′12″W; 21°44′6″S, 042°33′14″W; first record on 30.III.2013; obs.; multiple (no sexual dimorphism).

Identification. Head, upperparts, and underparts uniformly dull grey, except blue upper wing-coverts.

***Thraupis palmarum* (Wied, 1821)**, Palm Tanager

Observations. BRAZIL – Minas Gerais • Estrela Dalva and Volta Grande; 21°44′33″S, 042°27′41″W; 21°46′59″S, 042°29′42″W; 21°46′52″S, 042°28′12″W; 21°44′6″S, 042°33′14″W; first record on 26.XII.2018; obs.; multiple (no sexual dimorphism).

Identification. Upperparts smoky brown, underparts shining smoky buff with yellowish tinge. Upper wing-coverts paler than back with slight yellowish tinge.

***Stilpnia cayana* (Linnaeus, 1766)**, Burnished-buff Tanager

Observations. BRAZIL – Minas Gerais • Estrela Dalva; 21°43′55″S, 042°29′27″W; 21°42′15″S, 042°30′27″W; 21°44′33″S, 042°27′41″W; first record on 30.III.2013; obs.; multiple (♂ and ♀).

Identification. Male has upperparts and underparts yellow; mask, throat and centre of belly black and wings pale blue. Female has similar colouration but is generally more muted.

DISCUSSION

Our study provides the first checklist of bird species in the municipalities of Estrela Dalva and Volta Grande, southeastern Brazil. This represents an important contribution on the knowledge of biodiversity and conservation of bird communities in the unprotected remaining forest fragments of the Paraíba do Sul River basin, which has a long history of extensive degradation. Our findings reveal that these municipalities are crucial in supporting regional biodiversity despite the widespread devastation of their original vegetation. The 172 native species that we recorded in these municipalities represent approximately 22%, 19%, and 9.2% of the bird species that occur in the state of Minas Gerais, the Atlantic Forest region, and Brazil, respectively. Similar results in terms of species richness and species assemblages were also reported by studies carried out in other municipalities in the state of Minas Gerais, such as Ribon et al. (2004) in the municipalities of Goianá and Rio Novo, approximately 50 km from our study area; Ribon (2000) in the municipality of Ijaci; and Lopes (2006) in the municipalities of Varginha and Elóis Mendes. All these areas are affected by human activities and are characterized by high rates of forest loss and degradation.

Like other studies conducted in remnants of seasonal Atlantic forests in the state of Minas Gerais (e.g., Ribon 2000; Ribon et al. 2003; Ribon et al. 2004; Manhães and Loures-Ribeiro 2005; Faria et al. 2006; Lopes 2006), the municipalities of Estrela Dalva and Volta Grande still harbor a diverse avifauna. The high prevalence of Passeriformes in our study area can be attributed to the significant diversity of this, as this taxon constitutes more than 60% of total bird species globally. The high richness of species in the Tyrannidae and Thraupidae families is typical of Neotropical bird communities. The family Tyrannidae is one of the more diverse groups in this region (Sick 2001). The richness of the Thraupidae family may also be associated with the taxonomic changes proposed by Piacentini et al. (2015), which included the previously separated Emberizinae and Coerebinae as subfamilies within Thraupidae. The inclusion of these subfamilies considerably increases the number of Thraupidae species from 99 to 173.

All recorded exotic species are considered synanthropic birds, meaning that they have adapted to living with humans and have a well-known distribution in the Brazilian territory (Lowther and Cink 2020; Payne et al. 2020; Lowther and Johnston 2020). The greater number of taxa recorded in open areas is directly related to the history of occupation and destruction of the natural environments in the region. This history has resulted in the municipalities of Estrela Dalva and Volta Grande being mostly composed of pastures and degraded areas.

Our study registered several endemic and at-risk species that are all dependent or semi-dependent on forest habitats (Silva et al. 2003; Stotz et al. 1996; Table 1). These findings highlight the critical role of forest fragments in the maintenance and conservation of bird communities in the region despite the impacts of human activities. Endemic and threatened species require immediate attention and conservation or management measures to protect them. Since endemic species populations are restricted to specific geographical areas, they are more vulnerable to the negative effects of forest fragmentation and degradation than species with a broader distribution (Aleixo and Vielliard 1995; Anjos 2001; Ribon et al. 2003; Santos 2003).

Most of the bird species that we recorded are associated only with areas of open vegetation (i.e., forest-independents). The main factors driving this could be the reduction in forest habitats and the high level of habitat degradation due to human activities in the study area. However, we also recorded species that exclusively occur in forest environments (i.e., forest-dependents) and those that inhabit mosaics of forests, open, and semi-open vegetation (i.e., forest semi-dependents). This underscores the crucial role of forest remnants in preserving populations of birds with higher habitat quality requirements in these municipalities. Notably, we observed some forest-dependent species, in accordance with the classification proposed by Silva et al. (2003), in non-forest environments, such as *Patagioenas cayennensis*, *Aramides saracura*, *Tolmomyias sulphurescens*, *Todirostrum poliocephalum*, *Capsiempis flaveola*, *Myiodynastes maculatus*, *Setophaga pitiayumi*, and *Conirostrum speciosum* (see Table 1). Other studies conducted elsewhere have also reported their presence in non-forest habitats (e.g., Simon et al. 1999; Ribon et al. 2004; Dornelas et al. 2012). Thus, our conclusions reinforce the need to re-evaluate species classifications concerning their dependence on forests, considering that some proposed classifications are not supported by field observations.

We identified only one threatened taxon, *Formicarius colma ruficeps*, which is endemic to the Atlantic Forest and occurs between the states of Pernambuco (Northeastern Brazil) and Rio Grande do Sul (Southern Brazil), generally below 600 m altitude (Krabbe and Schulenberg 2020; Lima 2013). There are only a few old records of this rare taxon in the state of Minas Gerais, probably because of its disappearance in many locations due to the deforestation of native forests in this Brazilian state (Naumburg 1939; Pinto 1952; Viana et al. 2007). We detected this taxon through its vocalization in a forest remnant of approximately 10 km^2 located in Volta Grande. As for species categorized as Near Threatened, we highlight that *Jacamaralcyon tridactyla*, endemic to the Atlantic Forest, had its global conservation status recently downgraded from Vulnerable to Near Threatened (IUCN 2023), even though the remaining populations of the species continue to decline throughout its geographic range. On the other hand, *Primolius maracana* is heavily targeted as a pet and suffers from the impacts of illegal capture and trafficking (Rueness et al. 2020). Such practices have already led to the extinction of other parrots worldwide, such as *Cyanopsitta spixii* in Northeastern Brazil (Marini and Garcia 2005). Therefore, we understand that the main actions necessary for the conservation of threatened and Near Threatened species in the municipalities of Estrela Dalva and Volta Grande are the protection of the remaining forest fragments, educational programs, and effective law enforcement aimed at repressing illegal hunting and capture.

The remaining native vegetation in Estrela Dalva and Volta Grande is highly disturbed and continuously threatened by the direct and indirect effects of livestock activities. Estrela Dalva and Volta Grande are recognized as areas of high species richness of endangered fauna and flora (Drummond et al. 2005), and our records of threatened and Near Threatened bird species reinforce this ecological status. This, coupled with the extensive forest degradation, has resulted in over half of the municipality of Estrela Dalva and the entire municipality of Volta Grande being respectively categorized as areas of extreme and high priority for the conservation of biological diversity in the state of Minas Gerais (Drummond et al. 2005).

Our results may be helpful in the development of public policies and conservation strategies at both local and regional levels. For example, promoting community-based monitoring or citizen science initiatives such as birdwatching can help mobilize local actions to address issues related to the conservation of forest fragments in municipalities. Furthermore, despite the significance of Estrela Dalva and Volta Grande in preserving endangered birds and other taxonomic groups, there are no established protected areas or adequate conservation initiatives to enhance the connectivity of the remaining forest fragments. To reverse bird population declines and preserve their habitats, we recommend creating strictly protected areas and implementing projects that aim to reconnect the remaining fragments situated mainly on private rural properties in these municipalities (Drummond et al. 2005; Develey 2021). We suggest that Atlantic Forest remnants in Estrela Dalva and Volta Grande have the potential to support a more significant number of species than those reported in this study. Hence, we suggest further studies with different methods and greater sampling efforts to increase the number of bird species recorded and to increase the knowledge of species' distributions and persistence in human-modified landscapes.

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ADDITIONAL INFORMATION

Conflict of interest

The authors declare that no competing interests exist.

Ethical statement

No ethical statement is reported.

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Author contributions

Conceptualization: GMT. Data curation: GMT. Formal analysis: GMT, SLA. Investigation: GMT, SLA. Methodology: GMT. Visualization: GMT, SLA. Project administration: GMT. Writing – original draft: GMT, SLA. Writing – review and editing: GMT, SLA.

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Data availability

All data that support the findings of this study are available in the main text.

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